University of Alberta

Advertising and Young Adult Snacking Behaviors

by

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ABSTRACT

This study sought to investigate whether exposure to television advertising for snack foods was associated with snacking behaviors in a young adult, university population. A cross sectional design guided by the tenets of cultivation analysis was used to create a web-based survey distributed to students attending the University of Alberta.

Results from this study indicated the presence of four primary relationships between television advertising and energy dense (ED) snack food consumption. Television was positively related to ED snack consumption, snacking while viewing and BMI. Additionally, advertising recognition was positively associated with ED snack consumption. Perceptions regarding the impact of advertising on dietary behaviors were also assessed.

In accordance with previous cross sectional results this study found small yet significant effects. However, due to the consistency with which these results and others point towards a positive relationship between advertising and dietary behaviors, this study provides both supplementary support and directions for future inquiry.

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TABLE OF CONTENTS

Chapter 1: Introduction and Background **1**

1.1 Factors Influencing Food Intake and Dietary Choices 3
1.2 Changes in Population Dietary Intakes and Advertising Practices 5
1.3 Television Advertising and Snacking Behaviors 5
1.4 Areas Needing Further Study 6
1.5 Justification for Population Choice 7
1.6 Theoretical Underpinnings 8
1.7 Study Objectives and Hypothesis 10

Chapter 2: Literature Review **12**

2.1 Content Analyses 12
2.1.1. Main aspects of content analysis research 13
2.1.2 Children's programming 14
2.1.3 Prime time programming 16
2.2 Targeting of Youth Populations 18
2.3 Advertising Recognition 18
2.4 Suspected Mechanisms between Television Advertising and Obesity 19
2.5 Television and Obesity 19
2.5.1 Television advertising and snacking: Experimental studies 20
2.5.2 Television advertising and snacking: Epidemiology studies 23

Chapter 3: Methods **25**

3.1 Participants 25
3.2 Measures: Creation of the Survey Instrument 25
3.2.1 Television viewing 28
3.2.2 Snack food 28
3.2.3 Advertising recall 29
3.2.4 Snacking behaviors and perceptions of television influence 30
3.2.5 Motivations 31
3.2.6 Attitudes 31
3.3 Procedures 32
3.3.1 Web-based survey 32
3.3.2 Selection of Participants 33
3.3.3 Inclusion criteria 34
3.3.4 Exclusion criteria 34
3.3.5 Validating the instrument 34
3.3.6 Ensuring privacy and confidentiality 34

Chapter 4: Results 36

4.1 Descriptive Analyses 36
4.1.1 Demographics of the sample 36
4.1.2 Content analysis 38
4.1.3 Television Viewing 41
4.1.4 Snack Food Consumption 42
4.1.5 Advertising Recall 44

4.2 Evaluation and Results of the Hypotheses 45
4.2.1 Hypothesis one 47
4.2.2 Hypothesis two 49
4.2.3 Hypothesis three 51
4.2.4 Hypothesis five 53
4.2.5 Hypothesis six 56
4.2.6 Hypothesis seven 58

Chapter 5 Discussion 61

5.1 The role of demographic variables 62
5.2 Objective One: The relationship between television advertising and snacking 64
5.2.1 Four primary relationships 65
5.3 Objective Two: Perceptions of television advertising on diet 67
5.4 Model Significance and explained variance 69
5.5 Results associated with Cultivation Analysis 70
5.6 Web-Based Research 72
5.7 Study Limitations 73

Chapter 6: Conclusions 75

6.1 Main Conclusion 75
6.2 Future Research 77
6.2.1 Dietary and Television viewing trends-Canadian Data 77
6.2.2 Other Media Sources 78
6.2.3 Web-based Research 79

References 80

Appendix A: Survey Instrument 87

Appendix B: Information Letters 91

Appendix C: Confidentiality Form 93

Appendix D: Study Hypothesis and Associated Results 94

LIST OF TABLES

Table 1: Actual and expected frequencies for television viewing group membership 27

Table 2: Example of scoring for advertising measure 29

Table 3: Advertising slogans used in survey 30

Table 4: Participant Demographics 37

Table 5: BMI comparison: Sample versus Canadian population 38

Table 6: Summary of commercials during one hour of programming 40

Table 7: Weekday viewing percentages 41

Table 8: Weekend viewing percentages 42

Table 9: Total sample consumption of energy dense snack foods 43

Table 10: Total sample consumption of healthy snack foods 44

Table 11: Continuous variables descriptive analysis 47

Table 12: Summary of hierarchical multiple regression predicting ED snack consumption 49

Table 13: Summary of logistic regression analysis predicting snacking while viewing 51

Table 14: Hierarchical regression analysis predicting energy dense snack consumption 53

Table 15: Summary of logistic regression analysis predicting classification of snack habits 54

Table 16: Summary of logistic regression analysis predicting comparison of habits to friends and peers 56

Table 17: Hierarchical regression analysis summary for television predicting BMI 58

Table 18: Summary of Logistic Regression Analysis Predicting perceptions of television influence 60

LIST OF FIGURES

Figure 1: Television viewing and ED snack consumption 48

Figure 2: Snacking while viewing and Television 50

Figure 3: Advertising slogan identification and ED snack consumption 52

Figure 4: Television and BMI 57

Figure 5: Percentage agreement that television affects personal diet decisions 60

Chapter 1: Introduction and Background

The prevalence of obesity in Canada is on the rise (Statistics Canada, 2002). Both adults and children are fast becoming susceptible to the multiple co-morbidities associated with obesity. Between 1985-2000 the population attributable risk (PAR) of death associated with overweight and obesity increased from 5.1% to 9.3% of all deaths among 20- to 64-year-olds (Katzmarzyk, 2004). In 1997 the physician, hospital and drug related costs in Canada associated with overweight and obesity reached 1.8 million, accounting for 2.4% of total health care expenditures for all diseases in that year (Birmingham, Muller, Spinelli & Anis, 1999).

The simplest explanation for this health issue is an imbalance between two very important elements: energy intake and energy expenditure. Unfortunately, interplay of influences on these elements is complex and difficult to tease out. Diet and increasingly sedentary lifestyles have been posited as primary targets in the quest to understanding some key mechanisms driving this population trend (Horgen & Brownell, 2002; Harnack & French, 2003). Understanding the influences on diet and activity involves an examination of a broad scope of factors.

Overall leisure time physical activity rates have improved throughout the 1990s (Craig, Russell, Cameron & Bauman, 2004). Unfortunately, 57% of Canada's adult population is still not active enough for optimal health (Statistics Canada, 2001), with certain groups such as women, girls and older people reporting especially low levels (Craig et al., 2004). Factors contributing to decreased activity levels include decreasing occupational activity, increasing use of automobiles, and the design of residential areas (French, Story & Jeffery, 2001). Census data from the United States have illustrated that

the number of people employed in positions requiring a large degree of energy expenditure has decreased. Anecdotally, this has been attributed in part to the ever expanding technology of labour saving devices (French et al., 2001). The landscape of residential areas has also become a cause for concern. Residential areas are becoming less centralized around commercial centers; this change discourages walking and encourages automobile use. Additionally, many neighborhoods lack parks, pathways and recreation centers that both provide and encourage active leisure pursuits (Stettler, 2002; French et al., 2001; Story, Neumark-Sztainer & French, 2002). In the case of children and adolescents this problem is made worse by the restriction or elimination of scheduled physical education classes (French et al., 2001). These are only a few of the possible mechanisms through which population physical activity rates can be affected. The investigation of the influences on population trends in physical activity is a very broad area of research. The focus of this study will remain entirely within the realm of energy intake.

Media in its many forms has great potential to influence population food choices and eating behaviors. Today there are messages related to diet everywhere one looks including magazines, billboards, newspapers, internet and of course television. Although there are many media avenues through which food messages are conveyed, television still receives the most attention and the highest advertising budgets from food companies (Story & French, 2004). In this study television is selected as the media form of interest.

This study is interested in the food related messages to which the viewing population is exposed and the effects that these messages have. As with childhood and adolescent obesity, dietary practices forged in childhood and adolescence are shown to

track into adulthood (Coon, Goldberg, Rogers & Tucker, 2001; Gracey, Story, Corti & Berlin, 1996). Therefore it is reasonable to suggest that poor population dietary habits may in part be related to the television content to which children, adolescents and young adults are exposed.

1.1 Factors Influencing Food Intake and Dietary Choices

To better understand the complexity of eating behaviors these factors can be divided into four broad categories of influence: individual, social environment, physical environment and societal or macrosystemic (Story et al., 2002).

Individual influences such as knowledge, attitudes, and preferences towards food types can play a large role in specific food choices. Especially among adolescent populations, research has shown that personal appeals to taste and appearance are very important (Story et al., 2002). Also affecting individual food choices are more specific meal and snack patterns. These include perceived barriers related to time and convenience of food preparation and dieting behaviors such as meal skipping (French et al., 2001; Story et al., 2002).

Social environmental factors are aspects related to the influence of friends, family and peers. These include social supports and behavior modeling that contribute to the creation and perpetuation of social norms. Data related to the influence of peers has been less than convincing (French et al., 2001; Story et al., 2002). However, it is well documented that the home environment plays a large role in personal food choices (French et al., 2001; Story et al., 2002). Studies have shown that decreasing frequency of family meals, especially dinner, is often correlated with increased consumption of fast foods and dining out in general, as well as decreased consumption of fruits and

vegetables (Neumark-Sztainer, Story, Ackard, Moe & Perry, 2000; Neumark-Sztainer, Hannon, Story, Croll & Perry, 2003). There are many social factors implicated in the social phenomena of changing family meal patterns. Most notably, the rise of single parent families and increased maternal employment has created a culture in which less time is being devoted to food preparation, thus encouraging fast food consumption, dining out and convenience food consumption (French et al.,2001; Story et al., 2002).

Physical environmental influences have two main attributes: accessibility and availability both inside and outside of the home. Obviously, food availability within the home plays a large role in food choices however, schools, workplaces and food establishments all increase food availability outside of the home. With approximately one third of meals being consumed away from home, schools and workplaces have become major sources of food delivery through vending services, fast food contracting and enticing advertising schemes (Jeffery & French, 1998; French et al.,2001; Story et al., 2002). Outside of the school and work environments the number of fast food establishments has been increasing, thus providing more choice and opportunity to consume fast foods (French et al., 2001; Story et al., 2002).

The last broad category, societal influences, include cultural norms related to eating behaviors such as portion size and eating outside of the home. Also categorized under societal influences are things like food production and distribution systems, multiple levels of policy regulating pricing and availability, as well as media and advertising (Story et al., 2002; St.Onge, Keller & Heymsfield, 2003; French et al., 2001).

The factors contained in each of these categories play a role in establishing population and individual eating behaviors. However, considering the pervasiveness of

food advertising within our society the relationship between advertising and food consumption behaviors deserves close attention.

1.2 Changes in Population Dietary Intakes and Advertising Practices

The past few decades have witnessed population level changes in dietary intake trends. People are eating increasingly more food away from home, are consuming more soft drinks and are snacking more often (Story & French, 2004; American Academy of Pediatrics (AAP), 2003; Schmitz & Jeffery, 2002). Snacking as a dietary behavior is the consumption of any food item that is not a meal. In terms of dietary trends, increased snacking is becoming an issue due to the types of snacks being consumed. Population intakes of energy dense snacks high in fat, sugar or salt are increasing (Story & French, 2004). Interestingly, changes in advertising practices have accompanied these secular dietary trends. Content analyses have shown that although the average time allotment for television commercials has not changed, the average commercial length has decreased, essentially doubling the number of product exposures (Kunkel, 2001; Kaiser, 2004). Secondly, the food marketing industry has increased and intensified the targeting of youth populations in an attempt to influence current and future consumer behaviors (Kraak & Pelletier, 1998). These changes in both dietary patterns and advertising methods are worthy of examination for associations.

1.3 Television Advertising and Snacking Behaviors

Recently a study was conducted that examined levels of food consumption associated with a variety of sedentary behaviors including: computer use, television viewing, reading and homework. Results revealed that significantly more food was consumed while viewing television in comparison to other sedentary activities (Utter,

2004). Coupled with the frequency and targeting of energy dense snack commercials to youth populations these results suggest that television viewing, particularly advertising, and snacking behaviors may be connected. Although television program content also presents food related messages, this discussion of food advertising considers only non-program, commercial spots.

Many studies have examined an array of food and snacking related behaviors potentially affected by food advertising. Most of these studies have focused on children and adolescent populations and examined outcomes such as purchase influence attempts (the "nag factor"), purchase behaviors, food choice and nutritional knowledge (Hastings et al., 2003; Story & French, 2004). Few studies have examined adult populations, particularly the young adult (aged 18-25) population. In fact, to our knowledge, little is known about the food consumption or television viewing habits of this age group. Yet for many young people, a critical period exists when they begin to establish themselves in living arrangements independent from their family of origin. Often this transition occurs when they embark on post-secondary education. At this time young adults become increasingly responsible for their personal lifestyle choices. They have control over dietary decisions, snacking patterns and television exposure, making this population an excellent group in which to study the potential influence of advertising on snacking behavior.

1.4 Areas Needing Further Study

Generally, it is not well understood what role snacking plays in the overall diet of the young adult population. Studies examining a variety of food choice and eating related behaviors have very rarely focused specifically on snacking patterns. In fact a

recent review of all food related surveys used in nutrition research concluded that questions pertaining specifically to snacking patterns in any population group were scarce (Hartline-Grafton, Nyman, Breifel & Cohen, 2004).

As experimental research evaluating the link between television viewing, eating patterns and body weight becomes increasingly more specific, it is important to understand the exact nature of both the influence that advertising exerts on food choice as well as the role snacking plays in the overall diet. Marshal and colleagues (2004) postulate that the consumption of energy dense snacks might be a confounder in the relationship between television viewing and body fat. The point being that television viewing as a sedentary behavior is not enough of an explanation. It follows then to examine how food advertising influences snacking. It is still unclear whether food advertising stimulates an increased consumption of energy dense snacks, whether this stimulation applies to category effects, brand effects or both; and whether consumption of energy dense snacks is influenced at times other than while watching television (Hastings et al., 2003).

1.5 Justification for Population Choice

There are several benefits for choosing a university, young adult population. It is relatively easy to access a large number of people belonging to this population thus affording an opportunity to invite a large sample of students to participate in the study.

Secondly, there are research benefits to surveying this population group. In the young adult population there is very little information available regarding television viewing and snacking behaviors. While food advertisers target intensely children, adolescents and young adults as one consumer group, research studies have focused only

on children and adolescent populations (Story & French, 2004; Kaiser, 2004). This exclusion of young adults might stem from the varying level of home and family influences affecting children, adolescents and young adults. Therefore young adult populations may not be researched as much because they have a different set of social influences on their eating behaviors which precludes their participation in studies with children and adolescents.

Research has shown that learned food related behaviors track from adolescence into adulthood, therefore it will be useful to document how these snacking behaviors are currently playing out in young adults; and whether these behaviors are related to the amount of television viewed. It should be noted that this study can only explore current snacking and television behaviors. Previous behaviors will not be investigated.

University students are also of interest because they have increasing control over dietary and television viewing decisions, a situational context that is different from child or adolescent populations.

Lastly, very little is known about the perceptions that young adults hold regarding the impact of advertising on their personal dietary choices. However one focus group study did report that adolescents tend not to believe that television advertising is especially influential on their food choices (Neumark-Sztainer, Perry & Casey, 1999).

1.6 Theoretical Underpinnings

Assessing the social impact of media is an inherently difficult task because of its ubiquitous nature in our society (Story et al., 2002). For this reason, it is necessary to note that television advertising is but one of many media outlets used by food companies. However, television is the most widely used form of media, and advertising budgets

allocate the greatest amount to television advertisements (Kaiser, 2004; Story & French, 2004). Because current young adult university students are a generation that have grown up with television through a period of increasing commercial food targeting, it is worth evaluating the possible relationships between current food advertising exposure and current snacking behaviors within this group. In order to frame this research, cultivation analysis is used as a larger heuristic device, giving the study its general theoretical framework. Cultivation analysis is a media effects theory that originated from communication studies (Finnegan & Viswanath, 2002), with much of the research focused on television violence. However, the framework can be used to evaluate television's impact on other social behaviours. Cultivation analysis posits that heavy TV viewers are more likely to perceive the world in terms of the ideas and values that are consistent with the 'TV reality' than that of light viewers (Gerbner, Gross, Morgan & Signorielli, 1994; Signorielli & Morgan, 1990). Alternatively, light viewers will be subject to less exposure to the 'TV reality' and be more likely to draw on other socio-cultural influences to create their own world view (Bryant & Bryant, 2001; Signorelli, 1997; Morgan & Signorelli, 1990).

The crux of cultivation analysis emphasizes that these ideas, beliefs, attitudes and behaviours are cultivated over time through repeated and lengthy exposure to TV socialization. Consequently, television is conceptualized as a system of messages that are generally consistent, repetitive and represent a general understanding or 'television world view' (Bryant & Bryant, 2001). For this study the television world view will deal generally with the food environment as presented by food companies and more specifically with snack food choices. The "TV Diet" as it relates to snacking behaviours

will represent a diet where no food is considered a 'bad food' and the consumption of energy-dense snacks is not indicative of unhealthy snacking behaviours. Snacking on energy dense snacks is fun, convenient, quick and tastes great. Energy-dense snacks are a normal, everyday dietary component which friends and family members all enjoy.

1.7 Study Objectives and Hypothesis

This is an exploratory study to investigate if exposure to television advertising for snack foods is associated with snacking behaviors in a young adult, university population. The objectives of this study are founded on the understanding that while food items generally make up a significant proportion of television advertisements, snack foods specifically are among the most heavily advertised (Byrd-Bredbenner, 2000; French et al., 2001; Jefferey et al., 1998; Kotz & Story, 1994) . Subsequently, the first objective is to assess whether there is a relationship between exposure to televised advertisements for energy-dense snack foods and snack food consumption, and if so, what is the nature of that relationship. For example does increased advertising recall influence consumption of energy dense snack foods, and is increased television viewing related to differences in attitudes to snacking and body mass index (BMI) of the participants.

The hypotheses to be tested are:

H 1.1) Heavy television viewing will be associated with increased consumption of energy dense (ED) snacks and low television viewing will be associated with lower consumptions of ED snacks.

H 1.2) Increased hours of television viewing will be positively associated with snacking while viewing television.

H 1.3) Identification of advertisements will be positively associated with consumption of ED snacks.

H 1.4) Motivations for choosing snack foods will be different for the heavy television viewers as compared to light viewers.

H 1.5) Higher television viewing will be associated with different perceptions regarding personal snacking habits than low levels of viewing.

H 1.6) Increased television viewing will be associated with higher BMI ratios.

The second objective is to conduct an examination of the perceived influence of television advertising on young adult food choices. The accompanying hypothesis to be tested is:

H 2.1) There will be a difference in perceptions regarding the influence of television advertising on snack habits according to level of television viewed. Participants that view high levels of television will perceive no impact of television on snack habits.

Chapter 2: Literature Review

The ability of the media to influence population food choices has been an active research area for many years. Studies dating to the mid 1970's illustrate the long term interest in this field (Sheikh, Prasad & Rao, 1974). In spite of all this time, research and energy devoted to this topic area, there are still components of this issue for which little is known or entirely understood. This review will outline and discuss some of the important research that has informed the creation of the present study. Discussion will begin with an examination of the recent content analyses conducted on both children's and prime time viewing hours. These analyses will present the characteristics of the current food advertising environment. Issues related to the targeting of youth populations and advertising recall are discussed in order to introduce how advertising may be affecting young adult snack consumption patterns. Lastly, a summary of important studies that have investigated the more general relationship between television viewing and obesity will introduce the research that has more specifically examined the impact of television advertising on food choice. These studies are presented according to study type, namely experimental and epidemiological.

2.1 Content Analyses

As gatekeepers of information dissemination, the media industry has a role in the legitimization and perpetuation of social behavioral norms (Finnegan & Viswanath, 2002). In Canada, television is a popular form of media with average per person viewing reaching 21 to 26 hours each week (Friends of Canadian Broadcasting , 2001). As such, television has become one of the nation's première storytellers (Gerbner, 1996). Long term exposure enables television to create a system of standardized and shared messages

that become amplified through repeated viewing by the population (Bryant, 2001; Coon & Tucker, 2001). As an intricate component of the television message system advertising communicates and reinforces messages regarding product availability and appropriate consumer behavior (Coon & Tucker, 2001; Carruth, Goldberg & Skinner, 1991).

2.1.1. Main aspects of content analysis research. Like most research conducted in the area of obesity as it is related to sedentary activities, the bulk of the content analysis research comes from the United States. Primarily this research has focused on one of two genres: children's Saturday morning television and prime time viewing from 7-11pm. The breadth of this research covers both program and commercial content, conducts counts of specific food groups represented and often constructs a "TV Diet" as presented by the advertisements. Additionally some studies have examined the explicit and implicit messages contained in food commercials (Story & Faulkner, 1990; Kotz, 1994).

Although the present study is only interested in television commercial content, it is useful to briefly mention the conclusions of studies that have examined program content. These analyses have concluded that food related behaviors do not match real life circumstances (Wilson, Quigley & Osman, 1999; Kaufman, 1980). Unrealistic body weights and over consumption of high fat and high sugar snacks in place of meals predominate as the typical televised food behaviors (Kaufman). As such, the ideas presented by program content contribute to an unrealistic "TV Diet" that is in direct contrast to current dietary recommendations (Wilson et al., 1999; Kaufman).

According to both prime time and Saturday morning content analyses the "T.V. Diet" holds true for advertisements as well as programming. Although it is often unstated, the intended purpose of a large majority of advertised foods is snacking. This poor dietary influence is further exacerbated by the distinct lack of promotion for nutritious fruits and vegetables as snack options (Kaiser, 2004). Interestingly, survey research has found that those foods that are often over consumed are also the most heavily advertised while foods that under consumed are also under advertised (Byrd-Bredbenner, 2000; French et al., 2001; Jefferey & French, 1998; Kotz & Story, 1994).

One of the difficulties with investigating the influence of media on a specific food behavior such as snacking is the multiplicity of methods used to categorize snack foods. Some analyses have differentiated between sweet and salty snacks while other do not; some have included sugared breakfast cereals with sweets; while others have considered these a category on their own (Jefferey & French, 1998; Kotz & Story, 1994). Cultural differences also play a role in the way research questions are investigated. Categorizations of what constitutes a snack food can be quite different depending on the researcher's country of origin (Woodward, Cumming, Ball, Williams, Hornsby & Boon, 1997). Finally, content analyses are often interested in nutrient information in reference to the total diet, rather than one aspect of dietary behavior such as snacking (Gore, 2003). For obvious reasons these issues present a challenge for future research.

2.1.2 Children's programming. Advertisements aired during specially allocated children's television viewing hours have been evaluated as a cross sectional examination and in comparison to earlier research. Kotz and Story (1994) conducted an analysis of five major American networks Saturday morning commercial content. Out of the 997

commercials captured over 52.5 hours of viewing, 564 (56.5%) commercials presented food products. Upon analysis researchers classified 43.6% of the foods advertised as belonging to categories for fats, oils, or sugars. Notably, this classification does not contain sugared cereals, which alone made up another 23% of total commercials (Kotz & Story, 1994). Due to the commercial over-representation of foods high in sugar, fat and oil, the researchers concluded that the sponsored dietary choices directly contrasted current dietary recommendations (Kotz & Story, 1994).

Other content analyses have employed a longitudinal approach (Gamble & Cotugna, 1999; Taras & Gage, 1995). In general, these studies have shown some interesting things. In the last twenty-five years, the number and types of foods advertised have changed, although these changes have not affected the overall nutritional composition of the advertised "TV Diet". Food advertising during children's programming remains flooded with advertisements for foods high in sugar, fat and salt. Taras & Gage (1995) concluded that in the last 25 years advertisements have become shorter and the relative number of cereal and snack commercials has decreased. However, these commercials have decreased only to make room for new food items such as processed and prepared foods (Taras & Gage, 1995).

After viewing sixteen hours of children's Saturday morning television Gamble and Cotugna (1999) calculated an average of twenty-four commercials per hour, seventeen of which advertised food products. According to their analysis the largest food group represented were sugared cereals, followed by prepared and processed foods and high fat, high sugar snacks. This study also made special note of the introduction of prepared and processed foods into the top three advertised food categories.

These analyses illustrate that although new foods have been introduced into the food advertising system, this system has compensated by reducing the length of individual commercials and doubling product exposure. Essentially, food advertising to children has changed very little; energy dense snacks and high sugar cereals remain over represented and the overall advertised diet does not meet current nutrition recommendations.

2.1.3 Prime time programming. Analyses of prime time advertising have followed a pattern similar to children's content analysis. Some studies have looked solely at advertising at one point in time, while others have used various techniques to look at long term changes.

A Canadian study identified, categorized and quantified commercials from five Canadian stations, both local and national over a period of one week (Ostbye, 1993). Mirroring the results from the analysis of children's television, this study found food commercials averaged twenty-eight percent of all commercials presented, making it the largest category. The three foods most often advertised in descending order were beverages, prepared foods, and salty/sweet snacks. A dietary analysis of the advertised items found that television food advertisements illustrated a diet high in sugar, fat and salt. Interestingly, there were significant differences in the number of commercials representing different food categories according to the station examined. For instance, the music station had significantly more soft drink advertisements. While this seems logical, based on the primary audience of a music channel, there were other notable differences. In comparison to the local and music channels, the two nationally broadcasted channels had more advertisements for prepared foods. These findings are

interesting simply because other studies have not reported these differences. However, it is unclear whether this is because other studies have not found them or have not looked for these types of differences. It should be noted that in this discussion prepared foods are reported in the literature separately from snacks because they can be used as meal items. However, prepared foods are primarily energy dense, nutrient poor food products that can conceivably also be consumed as snack foods and therefore the categories of meals and snacks in this case are not mutually exclusive.

Similar to content analyses of children's television, several researchers have chosen study designs that enable long term comparisons. Byrd-Bredbenner (2000) conducted a commercial content analysis that was repeated after a six year interval. Although this study only viewed a short number of total television time (17.5 hours), they reported that food commercials comprised 28% and 23% of total commercials in 1992 and 1998 respectively (Byrd-Bredbenner, 2000). Again this study concluded that sweets and fats were the most intensely advertised products in stark comparison to the almost total absence of fruit and vegetable advertisements. Similarly, in 1990 Story and Faulkner found 35% of all commercials evaluated were for food. Among these commercials, fast foods and other foods high in fat, salt and sugar were overrepresented.

Interestingly, Story and Faulkner (1990) also evaluated advertising claims and found that food commercials most often used "tastes good" or "fresh and natural" as advert messages (Story & Faulkner, 1990). This compares with a similar examination of children's advertising that found "tastes good" and "fun" were the two primary messages (Kotz & Story, 1994). Obviously taste is deemed to be a very important message and advertisers ensure that it is communicated to viewers of all ages. It should be noted that

although convenience was not found to be the most common message, it was also used regularly as a selling feature for food products (Story & Faulkner, 1990).

2.2 Targeting of Youth Populations

The youth population has become a very important target market for the food industry. A recent quote from the Harris Interactive Trends and 'Tudes Newsletter provides a succinct summary of this prevailing attitude:

> "This generation has become a huge consumer group that is worthy of attention from many businesses seeking to maximize their potential. Kids, teens and young adults spend significant amounts of their own money and influence the shopping behaviors of their parents, siblings, relatives and other adults in their lives." (Harris Interactive 2004).

Food commercials influence purchase and consumption behaviors in four ways. They increase product market share, attract and maintain brand loyalty, increase consumption of the product through the solicitation of new customers and increase the amount of product consumed by current users (Ostbye, 1993). With this in mind, it is interesting to recall that claims of taste and to some extent convenience, are regularly used by food companies as product selling features. Research has since found that adolescents whose primary motivations for food choice were taste and convenience also had the least nutritious total daily food intake (Horacek, 1998). In light of the intense targeting of the youth market, these connections seem too coincidental to simply ignore.

2.3 Advertising Recognition

Smoking research has shown that increased retention of advertising correlates with the frequency of smoking (Goldstein, 1987). A recent experiment has indicated that this might also hold true for food advertising. According to experimental results exposure and retention of advertisements stimulates and exaggerates unhealthy food

choices (Halford, 2004). Halford found that the more advertising that participants could recall from the exposure session was significantly correlated with increased food intakes of the advertised items. These results could have important implications for future studies that are evaluating the effects of food advertising on all populations.

2.4 Suspected Mechanisms between Television Advertising and Obesity

Researchers have identified three potential mechanisms to explain the relationship between television viewing and obesity. First, reduced energy expenditure from TV viewing displaces and essentially decreases physical activity. Second, while watching television people experience a decreased resting metabolic rate and thus burn less calories. Third, viewers may increase energy intake due to advertising stimulation to snack on energy-dense foods either while viewing or more generally as an increase in total snacking occasions (Robinson, 2001; Matheson, 2004; Dietz, 1985; Jeffery & Fox, 1982; Utter, 2003). While the first two mechanisms are interesting and deserve research attention, the focus of this project is concerned only with the last mechanism.

2.5 Television and Obesity

Several epidemiological studies have demonstrated a link between television viewing and overweight and obesity in both children and adolescents (Halford, 2004; Anderson, 1998; Crespo, 2001). However, producing this association in experimental studies has proven considerably more difficult. A recent meta-analysis of experimental studies concluded that there is little available evidence to suggest that television is a contributing factor to obesity (Marshall, Biddle, Gorely & Murdey, 2004). This meta-analysis suggested that TV viewing as a sedentary behavior does not necessarily act as a replacement for active behaviors, and does not account for any significant differences in

body weights (Marshall et al., 2004). However, these results do not necessarily prove that television viewing does not significantly contribute to overweight and obesity.

A randomized controlled trial (RCT) published by Robinson in 1999, found that a manipulated decrease in hours spent viewing did result in decreased BMI among participants. According to Robinson, in order to better understand the effects of television viewing on body weight, experimental studies need to be conducted using more valid measures of food consumption and more naturalistic study settings (Robinson, 2001). To date, studies that have evaluated the link between television and obesity have not necessarily been examining a specific eating behavior such as snacking. The act of television viewing might not be displacing physical activity in children or adults as suggested by Marshall and colleagues (2004). However, television advertising could be negatively influencing more specific patterns of eating, such as snacking, that will affect the prevalence of overweight and obesity over time. In fact both experimental and epidemiological studies have investigated the link between television advertisements and the consumption of energy dense foods, such as popular snack foods (Robinson, 2001).

2.5.1 Television advertising and snacking: experimental studies. Snacking behaviors among youth populations have been changing. Comparisons with data collected in 1977 show an alarming increase in the consumption of salty snacks, candy, soft drinks, fruit drinks and french fries (Nielson, 2002; Zizza, 2001). Understandably, this has sparked interest in understanding the drivers behind changing snack patterns. The simultaneous increase in youth targeted marketing of these same products is also worthy of note.

Experimental studies that have investigated the connection between television advertising and snack consumption have predominantly been interested in child populations. The unprecedented rise in childhood obesity coupled with the rise in youth targeted advertising have conspired to frame the research in this manner. As a group, experimental studies are fundamentally the same. All experiments randomly assign children into television viewing groups consisting of different advertising content manipulations. After viewing, each child chose a snack or a series of snack foods, either as a stated preference or for actual consumption. The biggest difference between these studies was the length of each experiment. The testing period among these experimental studies ranged from one to fourteen days. However, some studies were able to demonstrate that even one commercial exposure is enough to influence a child's food preference (Horgen, 2001). Consequently, these studies illustrated that children were more likely to choose advertised products after being exposed to advertising.

The most recent experimental trial to test advertising and snacking was an RCT conducted by Borzekowski et al., (2001). This trial tested children's stated preferences after a controlled exposure to product advertisements. The manipulated exposure consisted of two cartoon shorts realistically embedded with commercials for commonly advertised snacks, fast foods, soda and toys. The control group also viewed the same cartoon shorts embedded with educational segments. After viewing the children indicated through picture boards which products they would prefer if given the choice. Each question gave the option of an advertised product or a similar product that was not advertised. The results indicated that the children exposed to the advertisements were significantly more likely to choose the advertised items over the non-advertised items.

Questions of health aside, this experiment illustrated that at least in the short term, children's preferences were influenced by the commercial content to which they were exposed (Borzekowski et al., 2001).

Aside from the Borzekowski et al. (2001) trial, the majority of the experimental studies examining snacking and television advertising were conducted over twenty years ago (Gorn et al., 1980; Gorn et al., 1982; Jeffery et al., 1982). Although these experiments all reported small effect sizes, it is the direction of these effects that should be noted (Hastings et al., 2003). Each of these studies demonstrated that increased exposure to advertising for high fat, high sugar and high salt snack foods positively influenced children's choices of those foods. Studies by Gorn et al. (1980) and Jeffery et al. (1982) tested varying levels of commercial exposure in order to look for effects of advertising intensity. Although the effect sizes were small, each study concluded that increased advertising intensity had a demonstrated short term effect on food choices. The more advertising children were exposed to the more likely they were to choose an energy dense snack (Gorn et al., 1980; Jeffery et al., 1982).

One aspect that remains unclear is the idea of category effects. Some researchers believe that increased advertising will not only increase the preference and consumption of the advertised product, but it will also increase the consumption of similar, non-advertised products (Gorn et al., 1980; Hastings et al., 2003). Unfortunately, this has not been reliably reproduced in experimental studies thus far.

There have been some experimental studies that have shown negative or inconclusive results (Peterson, 1984; Cantor, 1981; Galst, 1980). These studies actually showed no result (Peterson, 1984) or the results were so small that the investigators

concluded that they were not meaningful (Galst, 1980; Cantor, 1981). Subsequent reanalysis of these studies have suggested that design limitations may have caused non-significant or inconclusive results (Hastings et al., 2003).

2.5.2 Television advertising and snacking: epidemiological studies. As previously mentioned there are two ways advertising could be influencing snacking behaviors. Adverts could be stimulating increased consumption of high-density snacks while viewing and they may also be influencing the wider dietary choices that are made continuously throughout each day. Results from the epidemiological research are varied. Cross sectional studies on children have shown that increased television viewing is accompanied by an increase in both the quantity of energy-dense snacks eaten with television and the overall daily consumption of these snacks (Matheson, 2004; Coon, 2001; Robinson, 1995). Interestingly, among high viewers, the snacks consumed with and without TV are all typically energy dense, but more snacks are consumed while watching TV. This suggests that television is acting as both a trigger to eat energy-dense snacks while actually viewing and at the same time influencing the overall consumption of these foods in place of more nutritionally balanced items.

Results in adolescent and young adult populations have been a little different. To our knowledge there has only been one study that examined adolescent television viewing and snack food consumption specifically (Woodward et al., 1997). This study found correlations between hours of television viewing and quantities of snack foods consumed. Increased television viewing resulted in decreased consumption of fruits and vegetables and increased consumption of high sugar snacks such as cookies and soda (Woodward et al., 1997).

Other cross sectional studies among these populations have found energy intake to be positively associated with television use (Utter, 2003; Stroebele, 2004). However, increased energy intake was not associated specifically with snacks or snacking behaviors. Instead, the extent of these data was simply an association between television and the types of snacks consumed rather than the quantity of snacks (Carruth, 1991; Gore, 2003). Consequently, it is unclear whether the affects of advertising are the same for children, adolescents and adults (Horgen & Brownell, 2001).

Upon reviewing the literature it is clear that the majority of this research has focused on the child and adolescent populations. Logically this is partially due to the concern that is generated when the health of youths is potentially threatened. However, research attention should also be paid to young adults because this age group may represent an opportunistic period in which dietary behaviors may be improved. Additionally, young adults are still considered youths by the snack food advertising industry and therefore remain a highly marketable and targeted group (Harris Interactive, 2004).

Chapter 3: Methods

The goal of this study was to describe quantitatively the snacking and television viewing habits of a university, young adult population. Using an exploratory, cross sectional design this study endeavored to obtain information regarding behaviors for which very little is known. As a theoretical guide, cultivation analysis was used for the formulation of each of the seven research hypotheses and the development of the survey tool. This chapter will discuss the methods used to conduct this study including selection of participants, measures used, procedures for data collection and data analysis.

3.1 Participants

The study sample was derived from the population of students attending the University of Alberta. This university, located in Edmonton, Alberta has a large student population base of 35000+ and has an extensive student catchment area. It captures students from many smaller communities throughout Alberta, in addition to many out of province students. Therefore, although the study sample was derived from a university population a variety of student backgrounds were represented.

3.2 Measures: Creation of the Survey Instrument

Participant information was collected using a 22-item questionnaire (Appendix A), developed using questions taken from a variety of previously validated research surveys (Shrum et al., 1998; Block et al., 2000; Gore et al., 2003; Hartline-Grafton et al., 2004). There were several benefits to employing a quantitative, self-administered questionnaire. The nature of this design requires that enough respondents fall into one of two extreme television-viewing groups, high or low. Previous research indicated that the majority of viewers will fall into the medium viewing category (Biddle et al., 2004; Utter,

2004). Consequently, a large population sample was necessary in order to ensure that enough participants would belong to either one of the two extreme viewing categories.

A key feature of the web-based survey was the inability of respondents to go back to already completed survey sections; this reduced the possibility of response bias. It was thought that participants may have been inclined to answer the snack food consumption related sections differently in light of the television viewing and advertising sections in the latter part of the survey.

The survey instrument consisted of six basic components: a television viewing assessment, a weekly snack food consumption assessment, recall of snack food advertising, snacking behaviors and perceptions regarding the influence of advertising, motivations for choosing snack foods, and attitudes related to energy-dense snack choices.

3.2.1 Television viewing. To assess television viewing patterns, a combination of two television viewing measures was used (Shrum et al., 1998). The first question asked participants to estimate the total number of hours viewed on one average weekday and one average weekend day. These answers were then summed to yield a weekly total. The second measure asked participants to estimate the number of hours viewed over one week for twelve different program types. The program types were the same as those used by Shrum (1998); a detailed report on the show types and the viewing frequencies can be found in Table 3. The results from these two measures were averaged together to obtain a weekly estimate of hours of television viewed. In previous research these measures were found to be highly correlated ($r = .79$) and thus acceptable to average together (Shrum et al., 1998). Unfortunately, this result was not replicated in the current study.

The correlation between the two measures was very low, (r = .53) and thus could not confidently be averaged together.

In order to compare the actual versus the expected frequencies for each measure and to ensure adequate representation in each viewing category, participants were categorized as high, medium or low television viewers. High viewers were participants who viewed four or more hours each day, medium viewers watched between two and three hours per day and low viewers watched one or fewer hours per day. These classifications were derived from the American Academy of Pediatrics television viewing classification system which uses three viewing categories: high, medium and low (AAP, 1986). Table 1 indicates the percentages of participants belonging to each television group that were expected based on previous research and that were found in the study. The actual frequencies resulting from television measure one more closely resembled the expected frequencies than those from television measure two.

Table 1: Actual and Expected Frequencies for Television Viewing Group Membership

Viewing Level	Expected	Measure One (Periods)	Measure Two (Programs)
Low	15	21	46
Medium	57	61	50
High	28	17	4

It is unclear why this would have been the case, but it is possible that participants misunderstood what the second measure was asking. However, the piloting of this

survey did not indicate any problems with either of the television measures. Unfortunately without doing further qualitative inquiry it is impossible to know what problems may have occurred. Because of the unexpected answers received from television measure two, their lack of correlation with television measure one and the dissimilarity to the expected frequencies, this measure was excluded from further analysis. Thus, the first measure which most closely replicated the expected frequencies quoted by previous research results was used as the sole measure of TV viewing (Utter et al., 2004; Biddle et al., 2004; AAP, 1986).

3.2.2 Snack food. Snack food consumption was measured using a food frequency questionnaire adapted from a previously validated questionnaire (Block et al., 2000). However, because the original food frequency questionnaire was intended to provide a more comprehensive measure of food consumption some questions were omitted. Additionally, the more detailed monthly consumption estimates were not relevant to the present study and were replaced with "less than once a week" and "never". The modified food frequency questionnaire provided a quantification of the amount of snack food, according to category, participants consumed in one typical week.

In total, there were twelve snack categories, seven were considered energy dense (ED) snack choices, and five were considered healthy snack choices. Each snack food category received a column score that was then totaled in order to make two snacking scores. The scores for each snack category ranged from zero, if a participant indicated never eating that snack, to four, if the participant indicated consumption to exceed five times in one week. Scoring was done in this way to enable an incremental increase for snacking. Therefore the higher the participant score indicated the consumption of more

snacks. The seven individual ED snack scores were totaled to create one ED snack score and the same was done for the five healthy snacks.

3.2.3 Advertising recall. Advertising recall consisted of two separate measures. First, participants were asked to name the first three commercials that came immediately to mind. This question asked individuals to fill in as much information as possible relating to the product name, product type and its associated jingle or slogan. One point was awarded for each answer that described a food product for a maximum advertising score of nine. Table 2 provides an example; the following responses would result in a score of three out of six points because one point was awarded for each correct food related answer. No points were awarded for non-food items.

Table 2: Example of scoring for advertising measure

Product Name	**Jingle or Slogan**	**Product Type**
Lays Chips	Bet you can't eat just one	Potato chips
	Zoom Zoom	Car

The second measure asked participants to finish the slogan or name the product type for ten listed snack food items. Table 3 provides a list of the slogan used. These products and their associated slogans were chosen from current television programming to ensure their currency in present commercial content. In order to do this a mini content analysis of Canadian television programming was performed. The results from this analysis will be presented in later sections.

Table 3: Advertising slogans used in survey

Advertising Slogan	Product Name
Melts in your mouth, not in your hand.	M & M's
Have a Break, Have a _____.	Kit Kat
Pop up some good times;_____time, anytime.	Orville Redenbacher popcorn
Bet you can't eat just one.	Lay's potato chips
Taste the rainbow.	Skittles candy
That's a lotta chocolate.	Chip's Ahoy cookies
Obey your thirst.	Sprite soda
Deliciously Tasty Dangerously Cheesy.	Cheetos Chezzies
Tastes Good Feels Good.	Wheat Thins crackers
The tasty snack with no trans-fat; Meet me at the __.	Tostitoes chips

3.2.4 Snacking behaviors and perceptions of television influence. There is a conspicuous lack of research and survey information dealing specifically with snacking behaviors (Hartline-Grafton et al., 2004). Food frequency questionnaires are primarily designed to gather a complete picture of food consumption. Furthermore, although previous literature has examined food intakes according to type, they do not usually differentiate meal versus snack consumption. Therefore, to collect information specifically about snacking, several studies were consulted (Gore et al., 2003; Woodward et al., 1997; Francis, 2003). Snacking while viewing television was assessed using one question which asked participants to rate on a five point Likert scale how many times per week they consumed a snack while watching television (Gore et al., 2003). Perceptions

regarding the influence of advertising on dietary decisions were measured using three questions each scored using a four point Likert response scale. These questions asked participants whether they felt television viewing affected their personal dietary decisions, their friends and peers decisions and whether food commercials enticed them to get something to eat.

3.2.5 Motivations. Based on the assumptions of cultivation analysis motivations for choosing different types of snack foods and the perceptions regarding current snacking habits were included. Because cultivation analysis maintains that television delivers a set of consistent messages that inform consumers about products and appropriate consumer attitudes and behaviors (Bryant & Bryant, 2001), it was important to ask questions generated from the appeals found in contemporary advertisements for numerous snack foods. The reason for the inclusion of these questions was to test whether people held attitudes that were similar to the televised advertising appeals. The messages included dealt with positive product depictions that emphasized low price, great taste, quick and convenient preparation with a conspicuous absence of nutrition information. Each of these questions used a Likert response scale. A modified version of those questions can be found within the 1994-1996 Diet and Health Knowledge Survey (United States Department of Agriculture (USDA), 2004; Hartline-Grafton et al., 2004).

3.2.6 Attitudes. Questions regarding the current health status of one's snacking habits asked whether participants felt their habits were healthy or not and whether they were similar to their friends and peers' habits. These questions were designed to flesh out whether or not these messages seemed to be internalized by television viewers. As cultivation analysis maintains that heavy viewers will hold opinions and attitudes more

akin to those presented on television than light viewers, these questions tried to get at some of the appeals that are presented in current snack food advertising.

3.3 Procedures

3.3.1 Web based survey. The survey instrument was distributed to participants through a specifically created website. Participants were solicited through an introductory letter distributed via University of Alberta Webmail to a random sample of university students. The services of Academic Technologies for Learning (ATL) was contracted for assistance with the creation of the web-based survey that was run off of a university server. ATL assisted with all technical aspects related to the web survey including assistance with design, data collection, and data transfer.

The research and design division of the Faculty of Extension at the University of Alberta the services of ATL may be contracted to assist faculties, departments, corporate and academic researchers, professors, sessionals and graduate students. ATL is a campus-wide support unit specializing in the areas of project and technological evaluation, faculty development, instructional development and design, student mentoring, research and research dissemination (ATL, 2004).

Because student email addresses are personal information, after obtaining ethics approval from Health Research Ethics Board (HREB), approval for accessing student personal email information was sought through the General Faculties Council (GFC). The GFC requires the completion and submission of a Freedom of Information and Protection of Privacy (FOIPP) application form. The FOIPP application is a ten-page contract that outlines the purpose and objectives of the study, the personal student

information that is being requested and the terms and conditions pertaining to the use of said personal information.

Once final approval to access student personal email information was granted by the GFC, the universities Computing and Networking Services (CNS) office was contacted to provide a random list of 5000 student email addresses.

3.3.2 Selection of participants. A large solicitation sample was necessary due to potentially low response rate and the large sample size requirements. Other similarly completed web-based surveys have produced a response rate of approximately 20% (Curtis, personal communication, October, 2004). Therefore, in order to meet calculated sample size requirements a large initial sample was required.

Sample size and power calculations were estimated using Cohen's (1992) guidelines for the detection of medium effects with α =0.05 and power= 0.08. According to the parameters set by Cohen for the specific statistical tests used in the data analysis, it was necessary to have a minimum of 107 participants in each viewing category. Since it was expected that the majority of participants would belong to the medium viewing category a large study sample was required. Based on previous research it was expected that approximately 28% of participants would be high television viewers and 15% would be low television viewers (Biddle et al., 2004; Utter, 2004).

After the list was obtained from CNS all email addresses in the sample were sent an information and invitation to participate letter (Appendix B). This letter outlined the research study, inclusion criteria and terms and conditions of participation as well as provided a direct link to the survey website. The participant was informed in writing that completion and submission of the survey instrument was indicative of their consent to

participate. One week later a reminder letter was sent to all students in the sample. Because no responder information was collected, all recipients were sent a reminder letter.

3.3.3 Inclusion criteria. The following were inclusion criteria for participation in this survey: 1) A student at the University of Alberta between the ages of 18 and 25. Because the CNS listserve was only able to provide a random list of all student email addresses ending with the @ualberta.ca, students that did not meet the age requirements for this study were included. The inclusion criteria was stated on the information letter alerting those that did not meet these requirements.

3.3.4 Exclusion criteria. 1) Improbable survey responses such as exceedingly unrealistic height and/or weight measures.

3.3.5 Validating the instrument. Prior to distribution of the final survey, pre-testing was performed with a class of University of Alberta students similar to the target population. Permission to approach the students was granted by the instructor, who was also a member of this thesis research committee. The class was introduced to the research student, the purpose of the pilot test session was explained, and students participated on a voluntary basis. After completing the survey the class was asked, as a group, to discuss any problems, omissions or misunderstandings encountered within the survey. This pilot testing led to some small changes in sentence structure and the addition of salted meats as a snack food choice. The primary purpose of this pilot testing was to ensure that there were no issues related to timing or face validity.

3.3.6 Ensuring privacy and confidentiality. Survey responses were completely anonymous. No identification information was collected or used in any way on the

survey. Participation and information received was solicited based on the condition of anonymity. In addition there were no questions that could have lead to personal identification when used in conjunction with already public knowledge. A hyper-link from the introductory email enabled access and submission of the survey without any attached means of identification such as an email address. This included the collection of information that would be required to track electronic IP addresses (a numerical number that the receiving computer uses to identify the computer sending the information). This number is completely separate and unrelated to the email address of the participant. Additionally, the program used in the creation and collection of the survey instrument was not programmed to collect or access information regarding IP addresses. Survey results were held in an electronic format with no paper copies of the surveys in their entirety. Only aggregated data were ever used in printed form. All disks and other electronic data receptacles remained locked in a filing cabinet in the Department of Public Health Sciences, and will be kept for seven years. Those with access to this information will include myself, Maria Thomson, and the thesis advisor Dr. Lory Laing. Since ATL was contracted to assist with the creation of the survey web-site, collection and transfer of data into SPSS, a signed confidentiality agreement was necessary from all employees with access to the information (Appendix C).

Chapter 4: Results

This chapter will present the findings of the descriptive data analysis beginning with the results of the content analysis followed by a description of the sample demographic information, television viewing and snacking habits. The second part of this section will focus on the results of the multivariate statistical analysis according to hypothesis.

4.1 Descriptive Analyses

4.1.1 Demographics of the sample. Out of the 5000 students solicited 638 surveys were returned, providing a response rate of approximately 13%. Because of the large solicitation group, sample size requirements were met. After removal of cases due to exclusion criteria, such as age restrictions and incomplete surveys, the final sample was 616 respondents. Demographic data for each participant were assessed including age, gender, BMI, living arrangements and changes in television viewing habits.

Table 4 presents the gender and age breakdowns of both the study sample and the university population from which the sample was derived. As illustrated, the gender and age distributions of the sample are very similar to those of the parent population. Thus, although the response rate was very low, it does appear that the sample demographics are representative of the total population.

Table 4: Participant Demographics

	Study Sample (N=616)		University (N=24442)	
Characteristic	**N**	**%**	**N**	**%**
Age				
18	76	12%	3135	13%
19	103	17%	3661	15%
20	111	18%	4199	17%
21	106	17%	4408	18%
22	97	16%	3408	14%
23	58	9%	2346	10%
24	38	6%	1777	7%
25	27	5%	1508	6%
Gender				
Male	222	36%	10534	43%
Female	393	64%	13908	57%

After completing the necessary computations the body mass index (BMI) of each participant was assessed (n=607). Calculated BMI scores ranged from 15.59 to 39.68 with a mean of 23.48 and a standard deviation of 3.96. Due to non-response and unrealistic responses seven participants were eliminated from all analyses that included BMI. Table 5 displays a comparison of BMI levels between the university sample used and the general Canadian population (Tjepkema, 2005). As illustrated the university student population has a lower prevalence of overweight and obesity as compared to the

Canadian population. This may be related to the increased education and SES status of the university population.

Table 5: BMI comparison: Sample versus Canadian Population

Sample	Underweight BMI <18.5	Normal weight BMI 18.5-24.99	Overweight BMI 25-29.99	Obese BMI 30+
University of Alberta study sample	5.8%	66%	21%	7%
Canadian population (18-24 yrs.)	4.5%	59.4%	24.8%	11.4%

The survey asked participants to describe their current living arrangements by choosing one of four residence groups. The most common responses were living at home with parents or relatives (52%, n=318) and living off campus with roommates (27%, n=163). Only 14% (n=86) and 8% (n=49) reported living in a campus residence and living off campus without roommates, respectively.

The scope of this survey was limited to the collection of current television and snacking patterns only. As such, for descriptive purposes, one survey question was used to identify how television viewing patterns may have changed in the last twelve months. Most participants responded that their viewing habits had either stayed the same (37%) or decreased (53%). Very few respondents (7%) reported increased television viewing in the past twelve months.

4.1.2 Content analysis. An abbreviated content analysis was completed for two reasons. First, in order to be confident in the advertising recall measures used in the survey it was necessary to be aware of the most current snack food brands and their

advertising tag lines or jingles. Second, this analysis enabled a brief snapshot of the frequency of snack food advertising on Canadian television.

Ten hours of Canadian television programming were examined for a period of one week during January 11 to January 17, 2005. In order to choose the programming to be examined the results from the 2004 TV Times Reader's Choice Awards were used (Kohanik, 2004). The top rated program from ten categories of interest was recorded for one hour throughout the week. If the program was only 30 minutes, it was recorded twice in the same week. After recording all of the programs the commercial content accompanying each program block was documented. If the commercial was for an energy dense snack food the jingle and/or tag line used in the commercial was also recorded. All jingle and product tag lines used in the survey were derived from this analysis.

The commercials were classified into one of thirteen food type categories and tallied using frequencies and percentages. Table 6 illustrates the results of this analysis by presenting each show, the frequency and percentage of total commercials, food commercials and energy dense food commercials. All food products advertised were included in the total food commercial category. The same snack classification used in the food frequency questionnaire was used here to identify energy dense snack advertisements. Fast food advertisements were included in the ED snack food count because it is possible that these foods are consumed both in replacement of and in addition to meals. Some examples of snack foods advertised included *Kit Kat* chocolate bars, *Dr Pepper* soda, *Dairy Queen* ice cream cakes and *Tim Horton's* monthly muffin offer.

Table 6: Summary of commercials during one hour of programming

Program	(n) of commercials	% Food commercials	% Food commercials that were ED
The Young and the Restless	45	24%	20%
Everybody Loves Raymond	34	12%	12%
Amazing Race	31	10%	10%
Oprah	26	8%	6%
CSI	32	28%	19%
Jeopardy	50	12%	10%
CTV News-The National	30	17%	17%
David Letterman	46	33%	26%
The Simpson's	32	25%	19%
Monday Night Football	32	22%	22%

Previous content analyses performed on a variety of both Canadian and American prime time programming have found that food commercials typically comprise anywhere from 23% to 35% of total commercial advertisements (Ostbye, 1993; Byrd-Bredbenner, 2000; Story & Faulkner, 1990). This study found that on average, food commercials comprised 19% of total commercial coverage, a number approaching those found by other content analyses. Although this is only a small-scale analysis of current Canadian programming, there did appear to be a great deal of difference between the number of total commercials, the percentage of food advertisements and the percentage of energy dense food advertisements depending on the program viewed. The proportion of food specific commercials per program ranged from as low as 8% to as high as 33% with anywhere from 6% to 26% being categorized as ED snack foods. The Oprah Winfrey talk show had the least number of food commercials and the least number of ED snack commercials. David Letterman, a late night talk show, and the sports programming Monday Night Football were associated with the highest percentages of ED snack

commercials. Additionally, food advertisements for four of the ten programs sampled were only for ED snacks. The proportion of food commercials found in this survey of programming was similar to the results found by previous studies. However, these results are merely descriptive. Further analysis is needed to understand the potential differences in commercial content by channel, program type and target audience.

4.1.3 Television viewing. The results from television measure one are summarized in Tables 7 and 8. As illustrated, few differences existed between the viewing distributions of weekend and weekday viewing. The most popular viewing period was prime time for both weekday and weekend viewing. Afternoon viewing was the next most popular. The percentages for both morning and late night television viewing were quite low, with most participants reporting zero hours viewed during these times for both weekday and weekend viewing. However, there was a small increase in the late night weekend viewing. As a group, there were modest differences between weekend and weekday viewing, with prime time, afternoon and late night weekends being the primary viewing periods.

Table 7: Weekday Viewing Percentages (n=616)

Hours/Day	Morning	Afternoon	Primetime	Late Night
0	84%	60%	15%	88%
1-2	16%	39%	69%	12%
3-4	0%	2%	15%	0%
5+	0%	1%	1%	0%

Table 8: Weekend Viewing Percentages (n=616)

Hours/Day	Morning	Afternoon	Primetime	Late Night
0	82%	53%	26%	74%
1-2	17%	40%	53%	23%
3-4	1%	6%	18%	4%
5+	0%	1%	3%	0%

4.1.4 Snack food consumption. Snacking behaviors regarding food types, consumption frequencies and diet perceptions are virtually unknown in the Canadian youth population. Participants were asked to indicate how many times in one week a snack from each of twelve snack categories was consumed. Broad consumption categories were meant to enable increased inclusion of all snack types to facilitate a description of young adult snacking by both snack type and frequency. This measure also included an "other" category, however this category was not included in the calculation of the snacking scores. It was decided not to include the "other" category into the snacking scores for two reasons. First, 88% of the answers for the "Other" snack category indicated either a non-response or "Never". Second, the list of "other snacks consumed" did not lend itself to easy categorization as either a healthy or an ED snack type. The majority of the other snacks listed were for foodstuffs such as coffee, tea and leftovers. The remaining answers were items that when placed in an already existing category did not change the score of that category. For example, bread sticks quoted under "Other" as consumed 3-4 times per week mirrored the answer recorded for the bread category, therefore the category results would not have changed. For the most part,

the "other" category was used to ensure that if there was a foodstuff that was not included on the list but proved to be an important snack item it could still be accounted for in the descriptive analysis. This did not appear to be the case.

Tables 9 and 10 summarize the frequencies reported for consumption of each snack food category. None of the ED snacks were consumed in great quantities. Most consumption occurred between one and two times per week with salty snacks and baked goods the most popular categories. A very different distribution was found for healthy snacks. With the exception of nuts, all of these snack categories displayed an high consumption trend. Most people choose snacking on dairy, vegetables, bread and fruit more than fives times per week. The most popular healthy snacks were fruits and dairy. According to these results the frequency with which this population chooses healthy snacks is much greater than ED snacks.

Table 9: Total sample consumption of energy dense snack foods (n=616)

Responses	Salty	Baked Goods	Soft/Sweet Drinks	Candy	Ice cream/ Frozen yogurt	Snack Bars	Salty Meats
Never	7.6%	5.5%	20.9%	14.9%	26.3%	23.2%	68.0%
>1 week	31.7%	30.5%	27.4%	42.2%	51.0%	24.2%	23.5%
1-2 week	35.9%	36.0%	21.9%	24.8%	16.2%	23.5%	4.4%
3-4 week	18.8%	20.3%	13.3%	13.1%	4.9%	19.3%	2.3%
5+ week	5.2%	6.0%	15.7%	4.9%	1.3%	9.3%	1.0%

Table 10: Total sample consumption of healthy snack foods (n=616)

Responses	Dairy	Vegetables	Bread	Nuts	Fruits
Never	3.6%	6.2%	8.3%	32.3%	0.8%
>1 week	10.4%	16.9%	20.1%	37.8%	7.8%
1-2 week	18.4%	24.8%	21.1%	19.5%	18.7%
3-4 week	23.1%	25.5%	23.2%	7.0%	27.8%
5+ week	43.5%	25.5%	27.1%	2.9%	44.5%

4.1.5 Advertising recall. Two survey measures sought to gather information related to participant recall of current television advertising. These measures were originally intended to be used to evaluate hypothesis three. Unfortunately after univariate statistical testing only one measure was found to be statically significant and thus used in further hypothesis testing. These results are discussed in later sections.

Although the first advertising recall measure was not statistically significant it is still interesting to present some descriptive information that was gathered. This advertising measure asked participants to recall three commercials and record as much information as possible pertaining to the product name, type and jingle. It was hypothesized that because of the large presence of food related commercials a large number of recalled commercials would be for food products. All participants had an opportunity to recall up to three commercials; 22% of participants did not recall any commercials. From the remaining participants a total of 1259 commercials were recalled; 450 (36%) of these commercials were for food products. This proportion is similar to average percentages of televised food commercials (23%-35%) reported by

content analyses (Story & Faulkner, 1990; Byrd-Bredbenner, 2000). In comparison, only 9% of the total commercials recalled were for cars. Interestingly, one of the more pervasive food commercials appeared to be for McDonalds products, which alone accounted for 19% of the total food related commercials recalled.

Although there were no statistically significant differences between food advertising recall and consumption of energy dense snacks, these descriptive data illustrate an interesting pattern. It is obvious that the large proportion of televised food commercials do impact patterns of advertising recall to some degree; as illustrated by the corresponding percentages of food product recall to advertising representation on television.

4.2 Evaluation and Results of the Hypotheses

Using cultivation analysis as a guide, seven hypotheses were created to investigate the relationship between television advertising and young adult snacking behaviors. An outline of each hypothesis and its associated results can be found in Appendix D. Specifically these hypotheses were meant to evaluate whether there was association between television advertising for ED snack foods and consumption of these foods and what the perceived effects of this advertising were on the young adult population.

Although two snacking consumption scores were calculated, a healthy snack score and an ED snack score, only one of these was evaluated in each hypothesis. Upon preliminary, univariate statistical analysis it was discovered that the healthy snack scores did not differ significantly by hours of television viewing [χ^2 (2, N = 616) =.104,

p = .949]. Conversely, ED snack scores did [χ^2 (2, N = 616) = 12.028, p= .002].

Univariate statistics, including chi square analysis, were first performed on the data for each of the seven hypotheses. Only tests with significant results were investigated further using multivariate procedures. As a result of non-significant chi-square results, from all five of the individual questions that comprised hypothesis four, this hypothesis was not included in further multivariate investigation.

A small number of other measures were also excluded from further analysis because of non-significant univariate findings.

All sequential regression and direct logistic regression analyses were performed using SPSS Version 13.0. Table 11 presents a summary of the variables used. Due to missing information and outliers found in the BMI variable a small number of responses had to be excluded from analysis. Incomplete responses caused the deletion of six participants. A further three responses were deemed outliers using SPSS Explore and were also deleted from further data analysis. In examining the television viewing variable, extreme non-normality and skewness was found, thus a square root transformation was performed.

Table 11: Continuous variables descriptive analysis

Variable	n	M	SD
Age	616	20.82	1.93
ED Snacks	616	10.06	3.85
SQ-TV	616	3.85	1.64
BMI	607	23.48	3.96
Ad Slogans	616	9.61	3.33
Commercials Listed	616	1.92	2.33

4.2.1 Hypothesis one. **Heavy television viewing will be associated with increased consumption of ED snacks and low television viewing will be associated with lower consumptions of ED snacks.**

Sequential regression was employed to determine if, after controlling for age, sex and place of residence, the addition of information regarding television viewing hours improved the prediction of consumption of energy dense snacks.

Table 12 displays R, R^2, R^2 Adjusted, correlations, unstandardized regression coefficients (B) and intercept, as well as the standardized regression coefficients (β) for each of the variables.

The model as a whole was significant [$F(6,608)=7.799$, $p<.0005$]. Age and sex explained 1.9% of the variance in ED snack consumption. The entry of place of residence did not contribute significantly to model prediction. After entry of television viewing the model as a whole explained 7.1% of the variance. Television viewing was

responsible for the explanation of an additional 4.3 % of the variance when controlling for age, sex and place of residence. This contribution was statistically significant.

Three predictors, age, sex and television viewing made statistically significant unique contributions to the equation. These results, as illustrated in Figure 1, indicate that more television viewing was associated with an increase in consumption of energy dense snacks. Male respondents were also more likely to report eating more ED snacks than female respondents. Place of residence did not have any significant impact on the equation.

Figure 1: Television viewing and ED snack consumption

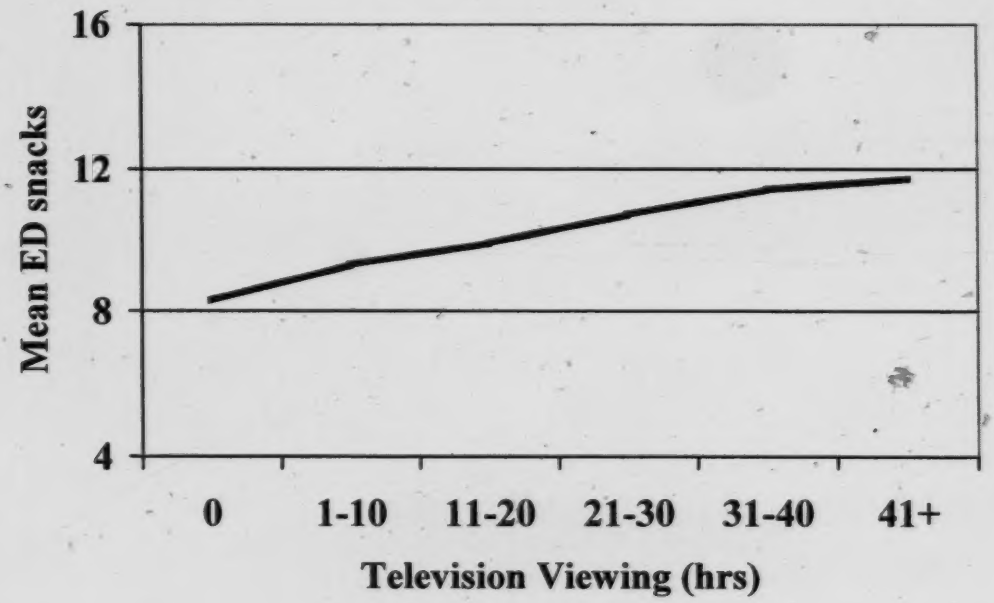

Table 12: Summary of hierarchical multiple regression predicting ED snack consumption (n=616)

Variables	B	SEB	B	R^2	ΔR^2
AGE	-.196	.084	-.098		
SEX	.664	.315	.083	.019	.019*
DCAMPUS	.789	.715	.071		
DPARENTS	.893	.596	.116		
DROOMMATE	.097	.617	.011	.029	.010
SQRT-TV	.494	.094	.211	.071	.043*

Intercept =11.396; DCAMPUS=dummy variable campus residence; DPARENTS= dummy variable parents residence; DROOMATE=dummy variable room mate residence
* p<.01

4.2.2 Hypothesis two. **Higher hours of television viewing will be positively associated with snacking while viewing television.**

To address this hypothesis snacking while watching television was regressed on age, sex, place of residence and television viewing in a direct logistic regression analysis.

A test of the full model with all four predictors against a constant-only model was statistically reliable, χ^2 (6, N=614)=168.14, p< .001, indicating that the predictors as a set reliably distinguished between those who eat while watching television and those who do not. The variance accounted for in eating while viewing, according to Cox and Snell and Nagelkerke R square statistics, is between 24% and 33% respectively (-2Log likelihood=649.907). An overall correct classification rate of 74% was observed.

Table 13 shows regression coefficients, Wald statistics, odds ratios and 95% confidence intervals for odds ratios for each of the predictors. The variables that reliably

predicted group membership were living on campus and television viewing. Those who reported living on campus were 70% less likely than those living off campus to report eating while viewing. In addition, as illustrated in Figure 2, for each extra hour of television viewed, participants were 2.16 times more likely to report snacking while viewing television.

Figure 2: Snacking while viewing and Television

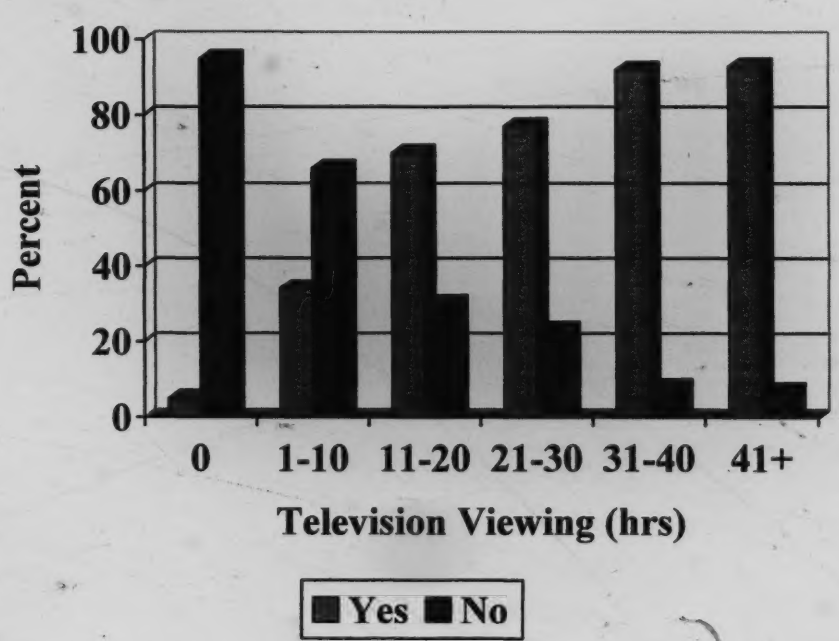

Table 13: Summary of logistic regression analysis predicting snacking while viewing (n=600)

Variable	B	SE	Wald Test	Odds Ratio	95% C I Upper	Lower
AGE	-.032	.053	.352	.969	1.076	.873
SEX	-.097	.202	.232	.907	1.348	.611
SQRT-TV	.769	.078	96.286	2.158	2.516	1.851
RESIDENCE(1)	-1.200	.468	6.577	.301	.754	.120
RESIDENCE(2)	-.627	.394	2.529	.534	1.157	.247
RESIDENCE(3)	-.151	.412	.134	.860	1.929	.384

SQRT-TV=square root transformation television variable; Residence(1)=campus residence; RESIDENCE(2)=parents residence; RESIDENCE(3)=roommates residence

4.2.3 Hypothesis three. **Identification of advertising slogans will be positively associated with the consumption of energy dense snack foods.**

Sequential regression was employed to determine if after controlling for age, sex and place of residence, the addition of information regarding knowledge of advertising slogans improved the prediction of consumption of energy dense snacks.

Table 14 displays R, R^2, R^2 Adjusted, correlations, unstandardized regression coefficients (B) and intercept, as well as the standardized regression coefficients (β) for each of the variables.

The model as a whole was significant [$F(6,608)=4.966$, $p<.0005$]. Age and sex explained 1.9% of the variance in ED snack consumption. Again the entry of place of residence did not contribute significantly to model prediction. After entry of

slogan scores, the model as a whole explained 4.7% of the variance. Scores on the slogan identification measure accounted for little of the variance (1.8%). However, this contribution was statistically significant.

Only two variables, age and slogan identification made statistically significant unique contributions to the equation, with slogan identification making the largest contribution. As indicated in Figure 3, a positive association existed between increasing consumption of energy dense snack foods and higher scores on the slogan identification measure. Interestingly, there was also a negative association between age and energy dense snack consumption; as age increased ED snack consumption decreased.

Figure 3: Advertising slogan identification and ED snack consumption

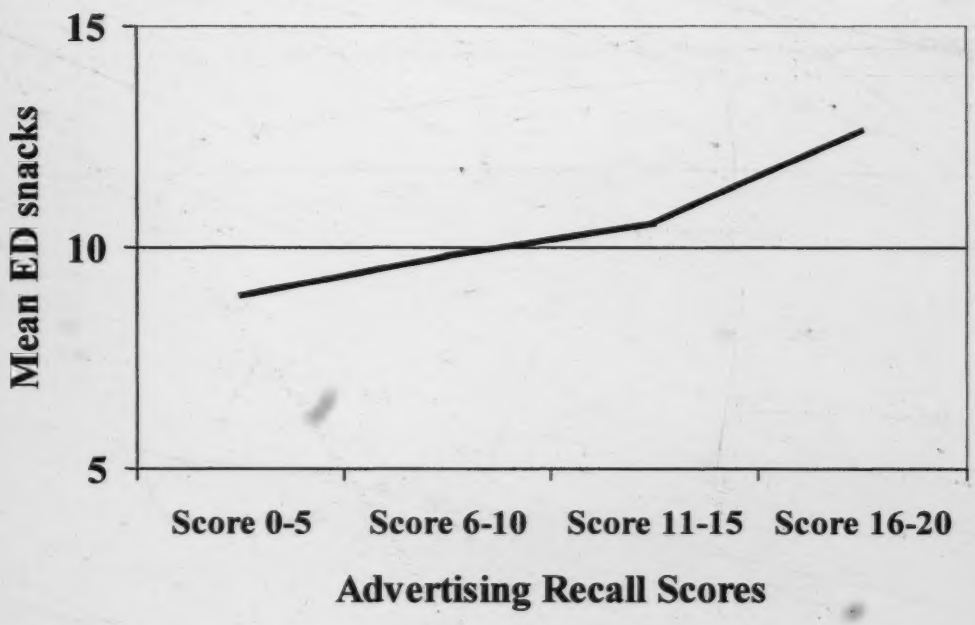

Table 14: Hierarchical Regression Analysis predicting energy dense snack consumption (N=616)

Variables	B	SEB	β	R^2	ΔR^2
Step 1	-.173	.086	-.087		
AGE					
SEX	.604	.319	.075	.019	.019*
Step 2	.632	.724	.057		
DCAMPUS					
DPARENTS	.973	.604	-.126		
DROOMMATE	.058	.626	.007	.029	.010
Step 3	.157	.047	.136	.047	.018*
SLOGANS					

Intercept =11.323; DCAMPUS=dummy variable campus residence; DPARENTS= dummy variable parents residence; DROOMATE=dummy variable room mate residence; * $p<.01$

4.2.4 Hypothesis five. **Higher television viewing will be associated with different perceptions regarding personal snacking habits than low levels of viewing.**

This hypothesis was assessed using two questions. Participant perceptions regarding snacking habits were assessed by asking whether their current snacking habits were: 1) healthy or unhealthy; and, 2) similar or different from the habits of their friends and peers. Each question was analyzed separately using logistic regression analysis. The original survey measures included either a "neither" or "same" response option for these two questions. In the present analysis those responses were not included. The results from these analyses are presented below.

Classification of Snacking Habits: Healthy or Unhealthy

The predictors used for this analysis were age, sex, place of residence and television viewing. A test of the full model with all four predictors against a constant-

only model was statistically reliable, χ^2 (6, N=521)=26.492, p< .001, indicating that the predictors as a set reliably distinguished between those who feel their snacking habits are healthy and those that do not. However, only a small amount of variance was explained and prediction success was low. According to Cox and Snell and Nagelkerke R square statistics between 5% and 7% of variance was explained (-2Log likelihood = 675.269). Prediction success was 64.1% overall.

Table 15 shows regression coefficients, Wald statistics, odds ratios and 95% confidence intervals for odds ratios for each of the predictors. The only predictor that reliably predicted group membership was television viewing. For each additional hour of television viewed, respondents were 0.78 times less likely to report healthy snack habits.

Table 15: Summary of logistic regression analysis predicting classification of snack habits (n=521)

Variables	B	SE	Wald Statistic	Odds Ratio	95% CI Upper	Lower
AGE	-.068	.051	1.747	.935	1.033	.846
SEX	.014	.195	.005	1.014	1.486	.692
SQRT-TV	-.277	.061	20.405	.758	.855	.672
RESIDENCE(1)	-.568	.433	1.721	.567	1.324	.243
RESIDENCE(2)	.002	.355	.000	1.002	2.101	.499
RESIDENCE(3)	.282	.369	.583	1.326	2.734	.643

SQRT-TV=square root transformation television variable; Residence(1)=campus residence; RESIDENCE(2)=parents residence; RESIDENCE(3)=roommates residence

Classification of snacking habits in comparison to friends and peers: Same or Different

The predictors used for this analysis were age, sex, place of residence and television viewing.

A test of the full model with all four predictors against a constant-only model was statistically reliable, χ^2 (6, N=489) = 13.52 $p < .05$, indicating that the predictors as a set reliably distinguish between those who feel their snacking habits are the same of different from friends and peers. However, only a small amount of variance was explained by this model and the prediction success was low. According to Cox and Snell and Nagelkerke R square statistics between 3% and 4% respectively (-2Log likelihood=603.298). Prediction success was 100% for those who felt their habits were different from friends and peers, 0% for those who felt they were similar and 68% overall.

Table 16 shows regression coefficients, Wald statistics, odds ratios and 95% confidence intervals for odds ratios for each of the predictors. The only predictor that reliably predicted group membership was sex. Females were 86% more likely than males to answer that their snacking habits were similar to friends and peers. Television viewing, age and residence did not contribute significantly to the predictive ability of this model.

Table 16: Summary of Logistic Regression Analysis predicting comparison of habits to friends and peers (N= 489)

Variables	B	SE	Wald Test	Odds Ratio	95% CI Upper	95% CI Lower
AGE	.001	.056	.001	1.001	1.117	.898
SEX	.619	.214	8.377	1.856	2.822	1.221
SQRT-TV	.090	.063	2.011	1.094	1.239	.966
RESIDENCE(1)	.435	.505	.742	1.545	4.161	.574
RESIDENCE(2)	.562	.424	1.758	1.754	4.022	.765
RESIDENCE(3)	.451	.435	1.075	1.570	3.687	.669

SQRT-TV=square root transformation television variable; Residence(1)=campus residence; RESIDENCE(2)=parents residence; RESIDENCE(3)=roommates residence

4.2.5 Hypothesis six. **Increased television viewing will be associated with higher BMI ratios.**

Sequential regression was employed to determine if after controlling for age, sex and place of residence the addition of information regarding television viewing hours improved the prediction of BMI.

Table 17 displays R, R^2, R^2 Adjusted, correlations, unstandardized regression coefficients (B) and intercept, as well as the standardized regression coefficients (β) for each of the variables.

The model as a whole was significant [$F(6,599)=9.716$, $p<.0005$]. Age and sex explained 4.8% of the variance in BMI. The entry of place of residence did not contribute significantly to model prediction. After entry of television viewing groups the model as a whole only explained 8.9% of the variance. Television viewing group was responsible for the explanation of an additional 3.9 % of the variance when controlling

for age, sex and place of residence. This contribution was statistically significant. Three predictors, age, sex and television viewing made statistically significant unique contributions to the equation. As illustrated by Figure 4, these results indicate that more television viewing was associated with a higher BMI. Similarly, increasing age was associated significantly with increasing BMI. Place of residence did not have any significant impact on the equation.

Figure 4: Television and BMI

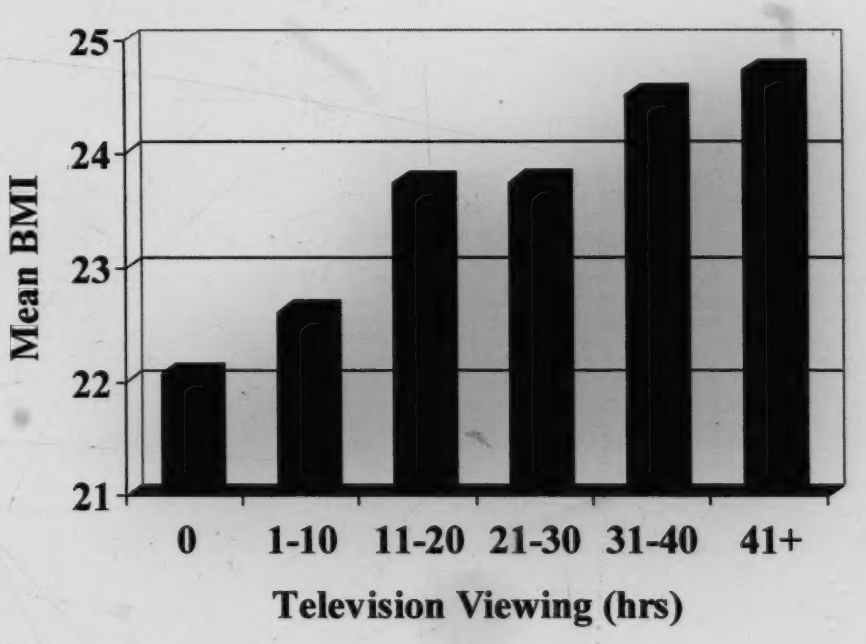

Table 17: Hierarchical Regression Analysis Summary for Television Predicting BMI (N=616)

Variable	B	SEB	B	R^2	ΔR^2
Step 1					
AGE	.198	.087	.096		
SEX	1.637	.324	.198	.048	.048*
Step 2					
DCAMPUS		.733	.085		
DPARENTS	.055	.612	.007		
DROOMMATE	.398	.633	.044	.050	.002
Step 3					
SQRT-TV	.488	.097	.201	.089	.039*

Intercept =16.613; SQRT-TV=square root transformation television variable; Residence(1)=campus residence; RESIDENCE(2)=parents residence; RESIDENCE(3)=roommates residence;
* p<.0005

4.2.6 Hypothesis seven. **There will be a difference in the perceptions regarding the influence of television advertising on snack habits according to level of television viewed. Participants who view high levels of television will perceive no impact of television on snack habits.**

The three questions that addressed this hypothesis were first evaluated using univariate statistics. Only one of the three questions found a statically significant difference by viewing group and thus was subjected to further investigation through logistic regression. There was no statistically significant difference by viewing group for

people who felt commercials either enticed them to snack while viewing or affected the general dietary decisions of friends, peers and families.

When asked whether television viewing affected personal dietary decisions there was a significant difference in those that agreed and did not agree by viewing category [χ^2 (2, N = 601) = 13.056, p = .001]. A direct logistic regression was performed using age, sex, residence and television viewing group as predictors. Only people who either agreed or disagreed with the statement were included in the analysis. All others were excluded.

A test of the full model with all four predictors against a constant-only model was statistically reliable, χ^2 (6, N=600) =35.473 p< .0001, indicating that the predictors as a set reliably distinguish between those who agree that television affects their dietary decisions and those who disagree. However, only a small amount of variance was explained by this model and the prediction success was low. According to Cox and Snell and Nagelkerke R square statistics between 6% and 8% of variance was explained (-2Log likelihood=733.769). Prediction success was 66%.

Table 18 shows regression coefficients, Wald statistics, odds ratios and 95% confidence intervals for odds ratios for each of the predictors. The only predictors that reliably predicted group membership were sex and television viewing. Females were 2.2 times more likely to answer that television affected their personal dietary decisions than males. As shown in Figure 5, each additional hour of television viewing, participants were 1.3 times more likely to report that television viewing affected their personal diet decisions. Place of residence and high television viewing did not contribute significantly to the predictive ability of this model.

Figure 5: Percentage agreement that television affects personal diet decisions

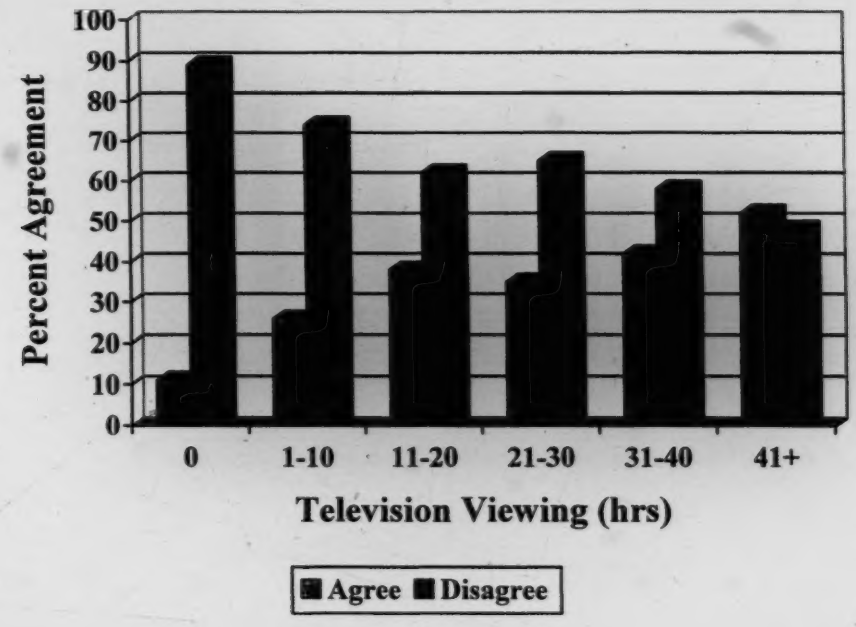

Table 18: Summary of Logistic Regression Analysis Predicting perceptions of television influence (N=600)

Variables	B	SE	Wald Test	Odds Ratio	95% CI Upper	95% CI Lower
AGE	-.023	.049	.222	.977	1.076	.887
SEX	.793	.197	16.256*	2.210	3.250	1.503
SQRT-TV	.231	.059	15.162*	1.260	1.415	1.122
RESIDENCE(1)	.233	.431	.293	1.263	2.940	.542
RESIDENCE(2)	.060	.359	.028	1.062	2.147	.526
RESIDENCE(3)	.220	.370	.356	1.247	2.572	.604

SQRT-TV=square root transformation television variable; Residence(1)=campus residence; RESIDENCE(2)=parents residence; RESIDENCE(3)=roommates residence
*p<.0005

Chapter 5: Discussion

There is a serious knowledge gap in relation to Canadian dietary trends especially with regard to population snacking patterns. Snacking as a dietary behavior is not well researched. Unfortunately the only available time trend data on population snacking patterns comes from the United States. Studies have found that snacking has become a more predominate part of the daily diet (Phillips et al., 2004; Jahns, Siega-Rizi & Popin, 2001). Since 1977 the average number of snacks consumed has increased significantly by approximately 24%-32%. Although the energy density of snacks has remained virtually unchanged, the sheer number of snacks consumed has increased. Snacks currently contribute an estimated 25% of dietary energy and as much as one fifth of other dietary nutrients. As the population fat intake decreased in the USA for all age groups it was found that the absolute and relative proportion of fat from snacks actually increased throughout the same period (Jahns et al., 2001). It seems that snacking is becoming an important dietary component.

Studies have examined food intake and caloric consumption in relation to television viewing but few have looked specifically at snacking. The majority of previous research has focused on total dietary consumption, which may mask the overall role of snacking in the Canadian diet. The following chapter is a discussion of the results beginning with an overview of the role of the demographic variables. The primary discussion will focus on the relationship between television advertising and snacking in relation to the study objectives and the cultivation hypothesis. Concluding this chapter will be an examination of the strengths and weaknesses involved in web based research and the study limitations.

5.1 The Role of Demographic Variables

Throughout all of the multivariate statistical procedures three variables, age, sex and place of residence were controlled for as possible confounders. Previous studies have shown that age, sex and socioeconomic status each play an influential role in population food consumption patterns. As the sample was entirely young adults attending university it was believed that socioeconomic status would not play a significant role and therefore no attempt was made to control for it. However, the consumption of healthy snacks in this sample was high which may be reflective of the higher educational and SES of university students as compared to the general population. Based on Canadian population research data that indicates a negative relationship between fruit and vegetable consumption and BMI (Tjepkema, 2005); the low levels of overweight and obesity found in this sample, as illustrated by Table 5, further suggest that healthy snack consumption in this sample may be higher than the general population. Consequently, increased levels of education and SES may have attenuated the link between healthy snacks and television viewing as both of these factors have been linked to diet and consumption behaviors (French et al., 2001; Raine, 2004).

Age played a minimal role overall in each of the hypotheses. There was a significant positive relationship between age and BMI ($\beta = .198$, $p<.0005$) as well as a significant negative relationship between age and reported ED snacking ($\beta = -0.98$, $p<.05$). It is possible that the limited age category suppressed the effect of age on these analyses.

There were some interesting findings related to snacking patterns, perceptions and gender. Males were more likely to consume more energy dense snacks than females

(β=.083, $p<.05$). Also females were more likely to report that they believed television affected their personal dietary decisions. Although it is not the goal of this study, these results could point to gender differences and possibly to body image ramifications resulting from exposure to television and advertising. Due to social proscriptions of beauty and body image it is possible that women feel more pressure than males to under report consumption of energy dense snacks. Furthermore, the differences seen between males and females regarding the perceived effect of television on dietary decisions may have been due, in part, to differences in the interpretation of the question. Television can be perceived as an influence on diet either by increasing or decreasing consumption of specific foods. For example, as television and advertisements potentially positively influence the consumption of ED snacks, other televised messages may be influencing dieting and food restrictive behaviors. No attempt was made in the wording of this survey question to specify what messages or what behaviors were felt to be influenced and in what manner. If this question was interpreted in terms of body image, women may have been more inclined to categorize dieting as a dietary behavior influenced by televised messages.

Previous studies have postulated that place of residence, especially in child and adolescent populations, may play a large role in determining food choice and food consumption patterns (French et al., 2001; Story et al., 2002). For example parental control and family eating habits could either constrain or cater to the consumption of specific foods and more general patterns of eating. It was thought that this may also be the case in a young adult, university population. University students typically fall into one of four living arrangement scenarios, living in a campus residence, or living off

campus either with friends, parents or alone. It was thought that it could be possible for these different situations to influence both television viewing habits and/or snacking habits. For instance, if a person lived in a school residence television viewing, which is typically communal, may be constrained. Alternatively, living with either parents or roommates may influence the types and quantities of snack foods that are readily available either positively or negatively. This did not appear to be the case. Place of residence only played a significant role in one of the seven multivariate tests undertaken. Students who reported living on campus were 70% less likely to report eating while viewing television than students living off campus. While interesting, this may be indicative of the ease in which snacks can be readily acquired without advanced planning. It may be less work to find a snack while watching television at a personal residence than it is in a campus residence due to limited residence food storage capabilities. Overall, place of residence may not have played a significant role in this sample because young adults truly do have increased autonomy and are typically able to acquire snack foods in whatever type or quantity desired regardless of the residential dietary milieu.

5.2 Objective One: The Relationship between Television Advertising and Snacking

The hypotheses for this study were chosen to enable an examination of the influence of television advertising on young adult snacking behaviors. From these hypotheses an interrelated pattern emerged among four primary relationships: television viewing and ED snack consumption, television viewing and snacking while viewing; advertising recognition and ED snack consumption and television viewing and BMI. Additionally there were surprising results from the self evaluation of snacking patterns. The following is a discussion of these relationships as they relate to the study findings.

5.2.1 Four primary relationships. The objective was to assess whether there was a relationship between advertising and ED snack consumption. The results do point to such a relationship in a number of interesting ways. As the number of hours of television viewing increased so did the number of ED snacks consumed. This relationship remained after controlling for potentially confounding demographic variables such as age, sex and place of residence.

Again, after controlling for demographic variables, statistically significant results indicated a positive relationship between correctly identified advertising slogans and consumption of ED snacks. This hypothesis was tested primarily because similar research on smoking found that retention of advertisements correlated with the frequency of product use (Goldstein, 1987). One of the primary arguments in media effects research revolves around the nature of advertising influence (Hastings et al., 2003; Young & Webley, 1996; Young, 2003). It is unknown whether advertising increases product use specifically by brand or more generally by category. This issue has proven to be a stumbling block for media effects research. Although these results cannot provide a definitive answer, they certainly point to some encouraging results. As previously noted, increasing television use was positively associated with increased ED snack consumption. Similarly, a positive relationship was found between advertising recognition and ED snack consumption. Accordingly, it seems that in addition to simply viewing television, remembering advertisements is also predictive of ED snack consumption. Further research is needed to expand on these preliminary findings and compare advertising recognition to specific product consumption.

One of the postulated mechanisms of influence of advertising on consumption states that viewers may increase energy intake due to advertising stimulation to snack on energy-dense foods either while viewing or more generally as an increase in total snacking occasions (Robinson, 2001; Matheson, 2004; Dietz, 1985; Jeffery & Fox, 1982; Utter, 2003). Results from the present study support claims for both of these influential pathways. As previously presented, there was a positive relationship between television and ED snack consumption, thus supporting the claim that snacking on specific food types may be increased. There were also results that supported an influence on snacking while actually viewing. A statistically significant relationship was found between television and snacking while viewing. In fact with each increasing hour of television viewed respondents were 2.2 times more likely to report snacking while viewing. Although this study is unable to comment on the directionality of these relationships, they do lend support to the supposition that advertising influences snacking patterns both during specific activity and more generally through overall consumption.

The relationship between television and BMI is heavily contested. Many studies have tried to find a relationship between these two variables with equivocal results (Phillips et al., 2004; Robinson et al., 1999; Marshall et al., 2004). A recent meta-analysis focused on children, concluded there is very little evidence for television influencing BMI (Marshall et al., 2004). In the current study television was significantly positively related to BMI. Although the variance explained by this model was very small, it does not discount the possibility of television having a negative effect on population level BMI ratios.

Television viewing as an activity may not be responsible for changes in BMI, instead behavioral changes, such as consumption patterns, resulting from viewing may be responsible. As previously discussed, a positive relationship was found between advertising recognition and ED snacks, hours of television and ED snacks and television and snacking while viewing. Together these results may be indicative of a possible mechanism through which television influences BMI. Specifically, television itself is not the issue; rather it is the patterns of behaviors, namely snacking, that may be influenced. Furthermore, a small but significant result may actually have a large effect on a population scale. An examination of the relationship between ED snacks and BMI was not included as a hypothesis for this study, however it would be an asset to include this test in future studies. Further research is needed to tease apart these relationships, examine whether small but statistically significant results are meaningful at the population level and to determine what influence advertising has on long term snacking patterns.

5.3 Objective Two- Perceptions of Television Advertising on Diet

The second study objective was to determine whether young adults perceived effects from television on their diets and snacking behaviors. In order to assess this a negative relationship between television and the perception of dietary effects was hypothesized. To address the issue of perceived television effects three questions were asked. No significant differences by television viewing were found to indicate that participants felt that television advertisements enticed snacking or that it affected the dietary decisions of friends, family and peers. However, after controlling for demographic variables it was found that as television increased respondents were more

likely to report feeling that television affected their personal dietary decisions. This was the exact opposite of what was hypothesized. Instead of becoming less aware of a potential television influence, people who viewed more television became more aware. One of the reasons for this may have been due to media education efforts and the higher educational status of the university population. This population may be more aware of the potential effects that television and media are postulated to have.

It is intriguing that as television viewing increased, respondents were more likely to report a perceived influence on dietary decisions but did not feel that advertising enticed them to eat. The wording of the survey questions may have played a role. The concept of what constituted influence over dietary behaviors could have encompassed many different effects and therefore allowed people to agree with the statement for numerous reasons; whereas the question regarding snacking asked about a specific behavior. People may only be aware of a general influence of television and either not believe an influence exists or not recognize a behavior specific influence like being enticed to eat by food commercials. For example, other studies have discussed the extent to which people may not be aware of their snacking patterns or how much they consume while watching television (Wasink, 2004; French, Story & Jeffery, 2001). Although only one of the three questions involved in this section found significant differences in relation to hours of television viewed, as a group these questions served to provide interesting information regarding the ways in which young adults perceive the potential influence of television on dietary behaviors. Additionally, these results differ from those found in adolescent populations in which no perceived influence was reported (Neumark-

Sztainer et al., 1999). Further investigation is required to understand how different populations and age groups come to perceive and interpret potential media influences.

5.4 Model Significance and Explained Variance

Although all of the hierarchical regression models were significant, none were able to explain more than 9% of the total variance in the dependent variable. Similarly only one logistic regression model was able to account for more than 20% variance. The remaining three models accounted for less than 8% of the variance in each of the various dependent variables.

Due to its large sample size this study benefited from high statistical power. Therefore the analyses were able to detect small statistically significant effects that may not have been detected in a smaller sample. However, because the direction of the study results show a consistent positive relationship throughout the hypotheses and are consistent with results from other studies, other factors may also be contributing (Borzekowski et al., 2001; Matheson, 2004; Coon, 2001; Robinson & Killen, 1995; Woodward et al., 1997; Jahns et al., 2001). For example, lack of generalizability of the sample to the population due to the low response rate may be attenuating the explanatory ability of the model. The use of self report measures may be a source of measurement error that is underestimating the relationships between the variables. Lastly, despite the use of known demographic variables such as age, sex and place of residence, there may be some important unknown and therefore untested variables contributing to these relationships. In spite of the limited explanatory power of these models there does appear to be a positive relationship between television viewing, advertising and consumption of ED snacks in the young adult population.

5.5 Results Associated with Cultivation Analysis

The tenets of cultivation analysis suggest that regular, long term exposure to television and advertising will have an effect on heavy viewers. Television is conceptualized as a system of messages that are generally consistent, repetitive and representative of a general understanding or 'television world view' (Bryant & Bryant, 2001). As more time is spent with television the number of external influences from which to gain experiential knowledge decreases and people begin to internalize the televised messages as real. For the purpose of this study the television worldview or "TV reality" was constructed based on messages presented by food companies through advertisements. The "TV Diet" was conceptualized as one in which no food was considered a 'bad food' and the consumption of energy-dense snacks was not indicative of unhealthy snacking behaviours. Snacking on energy dense snacks was typified as fun, convenient, quick and delicious. Energy-dense snacks were presented as a normal, everyday dietary component which friends and family members all routinely enjoyed.

Each of the seven hypotheses were constructed based on the assumption that high television viewing cultivated a TV reality that would be associated with distinct differences in opinions and behaviour patterns as compared to low viewing. Overall a relationship existed between television, snack consumption and certain snacking behaviours such as eating while viewing. However no evidence was found to support the idea of a constructed TV reality associated with increased viewing. It was expected that as television viewing increased respondents would be more likely to view their personal snacking habits as normal meaning similar to friends and peers and not unhealthy. In actuality, results indicated that as more television was viewed people were 24% more

likely to view their habits as unhealthy. This was the opposite of what the cultivation hypothesis, as used in this study, would suggest. Additionally, compared to friends and peers it was believed that the socialization of television advertising would lead respondents to believe that their snacking habits were similar. However, feelings of habit similarity or dissimilarity were not found to be significantly related to television viewing.

A further test of the TV reality compared how people felt about five common product appeals including low price, convenience, taste, decreased preparation time and health. It was hypothesised that if a TV reality was being cultivated increasing television viewing would be associated with greater regard for the first four appeals and less regard for the last. No statistically significant relationships between viewing and any of these appeals were found. It seems a logical argument to claim that appeals work at some level simply due to large advertising budgets allocated to the research and development of appropriate customer appeals (Story & French, 2004). However, if people differentially buy into advertising appeals for snack foods it is not differentiated by television. There may be others factors not accounted for that better distinguish between believers and non-believers of product appeals. Another option is simply that the appeals used in food advertising are universal to all snack food types healthy and unhealthy. Therefore, regardless of individual television viewing or snacking habits, people are sensitive to the same criteria when choosing snack foods. Lastly, it is possible that there are additional, unidentified factors responsible for stimulating snacking that have not been included in this study.

This study was not constructed to investigate and distinguish between the motivations for choosing one snack food over another. Rather, it was interested in

exploring the possibility of common advertising messages influencing the opinions of viewers as a possible mechanism of influence. In a general sense some form of cultivation may occur with television because there was an increasing trend associated with both general and specific snacking behaviours. However, it does not appear that the increasing consumption trends are related to an increased belief in a TV reality as created by common advertising themes and product appeals. Further study is required to understand the motivations for choosing specific snacks in different populations and how these motivations are influenced by advertising.

5.6 Web-Based Research

There are both positive and negative aspects to conducting web-based survey research. The ease with which the survey is disseminated, collected and entered into a database is excellent. Because answers are provided in computerized format data entry requirements are minimal. Data collection time requirements can be drastically reduced due to the speed at which large quantities of data can be collected and processed. Respondent participation is also made easy as the survey is available to them and can be filled out and submitted with little participant burden. These characteristics make web-based research the ideal candidate for large, population based surveys.

The first difficulty with web-based research is the issue of accessibility. Only respondents with access to both a computer and the internet are able to participate. Depending on the study population this might be a source of response bias. In this study it was assumed that all those solicited had regular access to both computers and the internet through the University of Alberta.

Solicitation and response rates also pose an important problem. Because participation is solicited through the internet (i.e. email), there is little or no contact between the researcher and study participants. Participants may not take the time to discover what the study is about and simply delete the email. There are several reasons why people may not want to participate in a web-based survey or open an unsolicited email. First, the internet maintains an air of informality which may discourage participation from those who are suspicious of the intentions of the sender. Second, because of the commonality of harmful computer viruses people may be wary about opening unsolicited emails regardless of the stated sender. Lastly, as is common with all surveys, people who are uninterested in the topic or may be inundated with unsolicited email and may simply choose not to respond. As a result low response rates may be indicative of response bias.

5.7 Study Limitations

The use of a cross sectional, self response survey does have some limitations. First, the cross sectional study design is only capable of investigating associations between variables; it is not capable of evaluating issues of causality. Additionally, this design is time limited, meaning that it is only capable of assessing the associations between current snacking and television viewing behaviors. It cannot evaluate the associations resulting from past behaviors. Second, self response measures are subject to participant recall bias. However the exploratory nature of this study precludes the use of lengthy, time consuming and participant burdensome activities such as long term television or food diaries. The recall measures used for both television viewing and

snack food consumption have been used and validated in prior research with positive results (Shrum et al., 1998; Block et al., 2000).

The use of a university population may also present a source of bias because of the higher education levels of participants. Therefore, these results are representative only of those individuals who attend post secondary education. However, as previously stated, this is a large university with an extended catchment area that draws students from a variety of backgrounds and communities.

The last limitation is the low survey response rate. The timing of the survey distribution attempted to strike a balance between research time constraints and student work demands to maximize the number of completed and returned surveys. Unfortunately, the response rate was less than that of other web-based surveys (Curtis, personal communication, October, 2004). It is unknown what affect the low response rate had on the representitivness of the sample population. It cannot be discounted that there may be self selection bias present in this study, with those who answered the survey being those who felt strongest about television viewing, snacking or both, therefore maximizing the differences seen between the highest and the lowest television viewers. It is unknown whether these results would be the same if there had been a higher response rate. However, because of the similarity of gender and age distributions between the sample and parent population, the achievement of expected high, medium and low viewer frequencies and the attainment of sample size requirements it is assumed that the responses were representative.

Chapter 6: Conclusions

6.1 Main Conclusions

The objectives of this study were to assess whether there was a relationship between exposure to televised advertisements for energy-dense snack foods and snack food consumption and to assess whether young adults perceived any influence of television on their dietary decisions. Underlying these objectives were four primary contextual elements related to the population under study. Dietary behaviors have been known to track from childhood and adolescence into adulthood, therefore it was thought appropriate to conduct an evaluation of current young adult television and snacking behaviors. Recent changes in population diet trends have seen an increase in snacking and an increase in the consumption of high fat, high energy foods (Phillips et al., 2004; Jahns, Siega-Rizi & Popin, 2001). It has been postulated that advertising may play a role in this trend, especially in light of the advertising budgets that food companies unleash on ED snack foods (Hastings et al, 2003). Lastly, changes in advertising techniques have resulted in the intensification and targeting of the youth population group. All of these elements combine to create the situational context for this study.

Generally, a relationship was found between television advertising and the consumption of ED snack foods. As previous studies have found the link between television and BMI tenuous (Marshall et al., 2004), these results suggest another mechanism of influence; the effects of advertising on snacking. Snacking on ED snack foods was found to be positively related to the number of hours of television viewed and the number of ED advertisements correctly identified. Furthermore, increased television viewing was positively associated with eating while viewing and BMI. Therefore it is

possible that advertisements stimulate snacking in two ways; first they exert a general influence over snack choice tending towards ED snacks. This is seemingly further substantiated by the failure to find a significant relationship between television and healthy snacks, which are not typically heavily advertised products. Second, as the leisure pursuit of television viewing appears to be associated with snacking, it is possible that a preference towards ED snacks is also encouraged at this time.

There is a need to evaluate the potential influence of media effects on the population because it is certain that advertising plays a role in the creation and perpetuation of social behavioral norms. In accordance with previous cross sectional results this study only found small yet significant effects (Woodward et al., 1997; Matheson, 2004; Coon, 2001; Robinson, 1995). However, there remains a consistency with which these results and others point towards a positive relationship between advertising and dietary behaviors. This measurable contribution must be understood within the wider context of factors that impact food consumption behaviors. Individual factors such as taste preferences; social environmental factors such as social support and behavior modeling; physical environmental factors including availability and accessibility; and cultural influences, of which media is one, but also including food production and distribution systems, all contribute to patterns of food consumption. Consequently it is important to understand where these small yet measurable effects are situated and what importance their contribution represents overall.

The results of this study did not strongly support the theory of a television cultivated reality among higher viewers. Although television seemingly influenced behavior, it did not impact opinions or attitudes. In order to understand how diet related

opinions, attitudes and beliefs are constructed and influenced, a broader conceptualization of cultural influences must be used; television alone does not suffice.

The primary goal of health professionals is to encourage and promote healthy lifestyle behaviors such as regular physical activity and healthy food choices at both the individual and the population levels. As such it is important to identify that these results represent a trend that links television advertising and snack food choices. Continued research into the mechanisms through which advertising may be affecting behaviors is needed to improve the current understanding and ensure that the effects truly are small. Until these relationships are more fully established health professionals should be aware that there is an influence and that advertising does, to some degree, affect the food choices of children, adolescents and young adults. This is an area that once properly understood can be attenuated through regulation and policy if necessary. As some countries such as Norway and Sweden have already implemented more rigorous forms of regulation of advertising to children, it remains to be seen whether this is an economically feasible and socially beneficial solution (Matthews et al., 2005).

6.2 Directions for Future Research

6.2.1 Dietary and television viewing trends-Canadian Data. Very little is known about the dietary and television use patterns of the Canadian population. The vast majority of research examining media use patterns, television content analyses, and media effects have come from USA populations. Canadian media use data are needed to facilitate an understanding of the extent to which all forms of media are used. For example age related information on television viewing patterns would inform research interested in target marketing of food products.

Media effects research that is capable of identifying causal relationships is also needed for all population age groups. Such research would be further improved through the use of theory and the devolvement of better media use measures that do not rely solely on self report.

Canadian dietary information is also lacking. Little is known about the current and longitudinal dietary trends of the Canadian population (Raine, 2004). As well, there is a paucity of research examining specific dietary behaviors such as snacking. This is exemplified by the deficiency of validated measures evaluating dietary patterns, including snacking. In light of these insufficiencies, more studies are needed to evaluate and track Canadian dietary information. Canadian food surveillance data would inform current and future health promotion research. After all, a substantial increase in snacking occasions may critically impact the health of the individual and on a larger scale, the population, by changing diets and eating patterns and contributing to lasting impacts on BMI and other lifestyle related chronic disease.

6.2.2 Other media sources. Electronic innovation and globalization have enabled the media to be everywhere and anywhere. Media advertisement comes in many forms and is essentially ubiquitous. Daily the Canadian population is met with a barrage of images and messages offering products, advice and lifestyle prescriptions. Although television is currently the most popular media form, the potential influence of all media should not be overlooked (Story & French, 2004). Future studies need to address all media forms including print, movies, signage, computer gaming and the internet. As the most recent avenue of advertising the internet is especially worrisome. Computers are becoming increasingly commonplace in Canadian homes and internet "surfing" has fast

become a popular form of entertainment (Story et al., 2004; Clocksin, Watson, & Ransdell, 2002). Yet comprehensive advertising rules and regulations have not accompanied this new entertainment form. The global nature of the internet makes it difficult for any one regulatory body to monitor, however that shouldn't allow food advertisers free reign. Future research should attempt to understand the mechanisms of advertising influence so as to inform policy and regulations that will protect vulnerable populations. This is needed not only to improve upon current regulation but more importantly to inform new policy that will be needed in the near future.

6.2.3 Web-based research. The internet has the potential to play an important role in the way future research is conducted. With web-based research comes the ability to quickly and efficiently solicit information from a large number of people. It also provides quick and efficient data preparation for analysis. As such it would be very good to use on large population based studies as well as long term studies that are meant to continuously collect data and monitor population trends. In order to facilitate this, barriers such as limited internet access, low survey response rates and researcher access to web-related resources first need to be addressed.

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Appendix A: Survey

Demographic Variables

1) Age_____ 2)Height___ft____in **OR**_____cm
3) Male☐ Female☐ 4)Weight_____pounds **OR** _____kg

5) Please check one that applies: Do you live:

On campus:	
In residence	
Off Campus:	
In parents/relatives home	
With room-mates	
Without room-mates	

Snack Food Consumption Patterns

Definition of a snack: *A snack food is any food consumed that is not a meal. Snacks can be any food type or product.*

6) In one typical week how often do you eat each of the following as a snack food?

Snacks	Never	Less then 1 a week	1-2 times a week	3-4 times a week	5+ times a week
Fruit: e.g. apple, orange, banana, 100% Juice and fruit bars					
Salty Snack: e.g. potato chips, cheezies, crackers, popcorn , pretzels					
Baked Goods: e.g. cookies, cakes, muffins, doughnuts,					
Soft drinks/Sweet drinks: e.g. Kool Aid, Fruitopia, Cola					
Dairy: e.g. yogurt, cottage cheese, milk					
Candy: e.g. licorice, skittles, chocolate bars,					
Vegetables: e.g. carrots, celery,					
Ice cream, Frozen Yogurt					
Bread/Rolls/Biscuits					
Nuts					
Snack Bars: e.g. granola or breakfast bars, power bars					
Salted Meats: beef jerky, pork rinds					
Other: Specify					

Motivations for Snack Food Selections

The next five questions are interested in some motivations for choosing foods for snacks. For each of the following five questions please circle on a scale of 1 to 4, which best describes your views.

7) When you choose foods for snacks how important is nutrition?

1	2	3	4
very important	somewhat important	not too important	not at all important

8) When you choose foods for snacks how important is price?

1	2	3	4
very important	somewhat important	not too important	not at all important

9) When you choose foods for snacks how important is it that the food is easy to prepare?

1	2	3	4
very important	somewhat important	not too important	not at all important

10) When you choose foods for snacks how important is taste?

1	2	3	4
very important	somewhat important	not too important	not at all important

11) When you choose foods for snacks how important is it that the snack saves time?

1	2	3	4
very important	somewhat important	not too important	not at all important

For each of the following three questions please circle the response on a scale of one to five, that best applies to you.

12) How healthy do you consider your current snacking patterns?

1	2	3	4	5
very unhealthy	somewhat healthy	neither	somewhat healthy	very healthy

13) How would you rate your personal snacking patterns in comparison to your friends and peers?

1	2	3	4	5
very different	somewhat different	same	somewhat similar	very similar

14) How often do you snack while watching television?

1	2	3	4	5
Never	less than 1/week	1-2 times/week	several times/week	every day

Television Viewing

15) Please indicate how many hours of television you watch on ONE TYPICAL WEEKDAY and one typical WEEKEND DAY for each time slot indicated:

Weekday:		**Weekend Day:**	
Morning (6am to Noon)	_____hrs	Morning(6am to Noon)	_____hrs
Afternoon (Noon-6pm)	_____hrs	Afternoon (Noon-6pm)	_____hrs
Prime Time (6pm-Midnight)	_____hrs	Prime Time (6pm-Midnight)	_____hrs
Late Night (Midnight-6am)	_____hrs	Late Night (Midnight-6am)	_____hrs

16) In a TYPICAL WEEK how many hours do you viewed each type of program listed below

Daytime Soap Opera	_____hrs	Drama Series	_____hrs
Comedy Series	_____hrs	Game show	_____hrs
Reality-TV Series	_____hrs	News	_____ hrs
Daily Talk show	_____hrs	Late Night Talk show	_____hrs
Sports	_____ hrs	Animated Series	_____hrs
TV Movies	_____ hrs	Other (Please list)	
		_____	_____hrs

17) Have your television viewing habits have changed dramatically over the last twelve months?

☐ viewing has increased ☐ viewing has decreased ☐ viewing has stayed the same

Advertising

18) When thinking about television advertising what are the first three television commercials that come to mind? Fill in as much as possible for each one.

Product Name	Slogan or Jingle	Product Type

19) How many of these do you know? Please finish the following slogans or name the product:

a) Melts in your mouth, not in your hand _____

b) Have a Break, Have a _____

c) Pop up some good times;_____time, anytime.

d) Bet you can't eat just one:_____

e) Taste the rainbow:_____

f) That's a lotta chocolate_____

g) Obey your thirst:_____

h) Deliciously tasty Dangerously Cheesy:_____

i) Tastes Good Feels Good_____

j) The tasty snack with no trans-fat. Meet me at the _____

Perceived impact of Television advertising

20) Television viewing affects my personal dietary decisions.

1	2	3	4
agree	somewhat agree	somewhat disagree	disagree

21) Seeing a food commercial makes you want to get something to eat

1	2	3	4
agree	somewhat agree	somewhat disagree	disagree

22) Television viewing affects other's (friends, peers, family) dietary decisions.

1	2	3	4
agree	somewhat agree	somewhat disagree	disagree

Appendix C: Confidentiality Agreement Form

I,_____, in conducting research of the project entitled **Advertising and Young Adult Snacking Behaviors** will ensure that all personal information collected, received and used in the course of my activities will be retained in confidence for the purposes of the research project. The personal information will never be disclosed or shared with any individual, other than those associated with the project, on a need to know basis.

Signature_____ Date_____

Appendix D: Study Hypothesis and Associated Results

Hypothesis	Supported by Data
Heavy television viewing will be associated with increased consumption of ED snacks and low television viewing will be associated with lower consumptions of ED snacks.	Yes
Higher hours of television viewing will be positively associated with snacking while viewing television.	Yes
Identification of advertising slogans will be positively associated with the consumption of energy dense snack foods.	Yes
Motivations for choosing snack foods will be different for the heavy television viewers as compared to light viewers.	No
Higher television viewing will be associated with different perceptions regarding personal snacking habits than low levels of viewing.	No
Increased television viewing will be associated with higher BMI ratios.	Yes
There will be a difference in the perceptions regarding the influence of television advertising on snack habits according to level of television viewed. Participants who view high levels of television will perceive no impact of television on snack habits.	No There was a difference in perceived impact, but not in the direction hypothesized.